```
INK IRE IT  JAB JET JIG JOY JAG JIM KEY KEN
KIN KEG LAX LEA LIP LOW LAY LET MAD MEN
MIX MOW MUD MAY NAB NAY NEW NOT
NUN NOR OAR OAK OIL OUR ORE OWN PAD PEN
PIE POD PUN PRY QUE RAN RAY RED RIP ROB
RUT SAG SEW SIP SOB SUN STY TAN TED TIP
TOY TUG THE URN USE ULT VAN VIE VOW VIA
VAT WHY WAS WEN WAS WON WAR YES YAM
YET YEW YOU ZAN    End of Message.
```

Start the first side of tape No. 2 through the machine quite slowly, in fact, just as slowly as it will make the characters plainly, and see how many of them you can get and write down. When you hear "one" put it down on the paper, but if you do not get it instantly, forget it and "lay" for the next one. If you try to figure out a letter that you do not get instantly, or hesitate to think about it, the machine will have made the next one when you are not prepared for it, and that also will be lost.

Simply force yourself to read them instantly. If at first you only get an occasional one in the whole side of the tape, it is a start and you are doing well. At the beginning it may be necessary to run the second side of the tape (the words) through the machine and just watch the copy, but not try to write them down, until you are somewhat familiar with the letters and figures. But, begin the words just as soon as possible.

After a time these simple words will become familiar, and you will know pretty well what is coming next, but that makes no difference, copy them just as carefully and faithfully as in the beginning, as it trains the ear to hear them quickly, without a moment's hesitation, just as you should do. Just run the tape a little faster after they become familiar.

There is a whole lot of practice on this tape, and if you are able to copy all of the matter correctly, at the rate of 10 words per minute within 30 days you will be doing well indeed.

SENDING PRACTICE: The first side of this tape is also excellent for sending practice, and by following the text you may send the characters once or twice before it passes thru the machine and thereby compare your sending with the perfect machine sending.

Do not attempt to send words at this time, unless it be the small words copied from tape No. 2. Practice making the letters and conventional signals over and over again. Always use copy to send from.

This tape should be reviewed occasionally to check up on the sending to see that the student is still making the characters correctly, and just as the machine makes them. One is liable to drift into an incorrect "swing" which s hard to eradicate when once formed.

Lesson and Tape No. 3

TAPE NO. 3: Tape No. 3 is made up of words larger than those on the second side of tape No. 2 and three letter code combinations with slightly

smaller spacing to enable you to progress gradually without seeming effort. In the code combinations, all letters of the alphabet are included several times.

The matter on tape No. 3 reads as follows:

First Side:

```
MAZE VAST CAT  ALSO NAPE AGOG QUIZ EARN
URGE OTIC GAFF BEND PACK HEAT RAZE BIRD
SALT FAST STYX IDEM TABU WHIM LAZY OBOE
DUCT DIOTA QUIT EPIC TONE KNOB NIP  HIVE
UNIT VOID FULL PAX  AXIS MUST HACK YARD
OUCH AYE  YELP XYST NOLL BARK TERM GLUM
SCUD FIX  PLAY LEND CURT PYX  JUNK QUOD
UPON OMEN YOWL GEAR NUMB DIME RHEA WRY
GILD VEND DARK IMP  TURN LIFE QUAD FEET
EVER MELT INCH TYPE HUSK PUFF WARD CENT
ZEBU JADE SULK COIL ZANY EDGE POGY UGLY
ELAN LOAD MIND PURL GOAL OPAL HOST SHOW
INTO SOFT EMU  MURK WORK KHAN RYOT ABLE
LUCK XEME KIND ZEIN RING CLUB ROCK FOIL
YUMA TORN
```

Second Side:

```
ABC XRO EZK TGM LDY FWI BVQ HUJ SNP
ZXY CIM JRV FKW QLN ODU SPH GYT KEW
NVF RDY VZQ PXH ZEU MSI DPF ITO ARZ
JOF QRB LDY UEJ BWL TVZ KPT WQX JGA
EUH PMI CJP HNL MKW YMU OVP XGJ ZDF
ROS VQH GTE ZBR SFX DRP IES AJD LDH
GVJ UKR PHG BOP HCF WSX QIN KBC CME
FTI XEK MWH OQS TPQ EGO ZNU NRW VLA
IAM RFB YUV JXL SZI DYT AVM PUR ERU
RBX VDB BFC GHD SJG KLH TMK CYP QWN
XTS JQV FOY NCA WEF UGE HIJ LKI MNL
YZQ ZXO IST DPW OAZ ALJ FIM QFP MDS
IBV BZY YMA WQC HUE VTG CVI SXL EKO
FHR LEU JCX NAZ ZNB XOD GPF USH TUK
RWN DYQ OJT KGW AUC XOD RAZ OCX    End of work.
```

SENDING PRACTICE: Do not overlook the instructions under "Sending," Page 16, when practicing, and at this time it would be splendid practice to use the words reproduced by tape No. 3. Remember do not try to send faster than you can receive the characters, as made by the Instructograph. Leave plenty of space between the letters of words, and more between the words, of course. Always try to keep in mind that some one must read what you are sending, and unless they can do so, it is a waste of time sending it. So, when you make a letter or word incorrectly, the wrong number of dots or incorrect spacing, make it over.

You should put in at least one third as much time practicing sending as you do on the receiving end of the work.

Lesson and Tape No. 4

TAPE NO. 4: Tape No. 4 consists of words larger than those on the first side of tape No. 3. Some of the words are quite difficult and will tax your ability to copy them correctly even after they are a little familiar. These words have been selected as containing combinations of letters rather difficult to read and should provide splendid practice.

The matter on tape No. 4 reads as follows:

First Side:

THE THIS THEM THOSE TIE TIME TIDE TITHE TEND
TEN END NAME DATE MOAT HOME HAND SAND SITE
AMEN AND TOAST MOAN MADE MATE ONION SODA
SOME HIM HAND HOST IDEA INDIA IDIOM IDES
IDIOT INTESTATE ITEM IODINE IONIAN INTO TEA
TEST INTEND EASE EASEMENT EASINESS EAST
EAT EDEN EDEMA EDIT EDITION ESTIMATION
EATEN TINNED TEND TENSION TENTH TITHE
TOTEM TOAD TOOTH TENT TIME MOTE MOTH
MOTION MITTEN MONSTER MOON MISSION ADAMANT
ADD ADEEM ADMIT ANISE NAME NINE NITID
SEASON STATE SEEM MISS DITTO DISTEND DINE
DINNER DIADEM DASH DANE AMEN MIST TOOTH
IMMINENT EMEND ESTATE EMINENT EMIT EMOTION
ESTIMATE END OATS ODE ODDS OSTEND SADDEST
SAID SOON SODOM SOME SAINTED NOTION NOISE
HAD HASTEN HEAT HOSTESS USE UDOMETER
UNABASH UNBOSOM URBANE UNIT UNITE UNITY
UNIVERSE UNION BABE BENIGN VAIN NOTATION NEATH
HAND HEAD HAITI HINT GAD GAGE GAIT GAMIN
GAMBIT GAUGE MITTEN MADDEN IMMEDIATE ONE
OMIT ONSET ONION

consciously allowing the key lever to raise before beginning the dot or dots. Normally one starts to make all characters with the key lever up. Hence, the tendency to allow the key to raise to a normal position. But, when making dots following a dash, (parts of the same character) they are made from the downward position of the key. That is, make the one, two or more dots following the dash from the downward position, without consciously allowing the key lever to raise.

Continued practice, closely following the sounds of the characters as made by the Instructograph, will soon eliminate all difficulty, if any is experienced, in making them correctly.

Practice with this tape should be continued until the student is able to make every character correctly and easily, just as they are made by the machine. Plenty of time should be put in on this tape, in order that the characters may be made correctly without having to hesitate to figure out just what dots and dashes make them up. Proper practice with this tape is the basis of your whole study, and the better it is learned, the better the ultimate result.

After having learned to make the characters correctly, and the student feels that he may lay tape No. 1 aside for a time, tape No. 2 may be taken up.

Lesson and Tape No. 2

TAPE NO. 2: This tape consists of the alphabet, numerals and some of the conventional signals in mixed form on one side, and small two and three letter words on the other side. To begin with, it may be a good idea to run the tape through the machine a few times, watching this copy and listening to the sound of the characters as the machine makes them, without attempting to write them down. This kind of practice has a tendency to impress the sound of the characters on the mind. The matter on tape No. 2 reads as follows:

First Side:

L A T G W S J O U Y C F H Q 2 X R F M B (1) Double Dash Y J G 6
W V F 3 M U A E G 7 X U I O 7 R ? K Period G P D 9 5 2 V F E 2 M Z
U C J L Attention signal—Double-dash (1) T W K B Q N D H V F Q Y
Period—End of message X K A O 6 J H C K 9 U K F 4 ? N U L G U D
A N Z (O) J P Q F C 8 2 L O R B H I E S T Double dash—End Message
7 W L M Q Period 3 V R H D I X Double dash—End Message—Attention signal H J W P J A Z K 9 U (1) Q U Y 9 3 R F L 7 Z W H F Q P B
3 V 8 S G L W (O) Y Error 8 F N 9 Q Q T X 9 H C P B 2 7 E O V Y
Double dash—End Message L A T G W S J O U Y C F H Q 2 X R F M
B (1) Double dash Y J G 6 W V F 3 M U A E G 7 X U I O 7 R ? K Period G P D 9 5 2 V F E 2 M Z U C J L Attention Signal—Double dash
(1) T W K B Q N D H V F Q Y Period—End Message.

Second Side:

ANY AND ACT AID ARE AXE BAD BAN BOY BAG
BET CAB CON CAP CRY COY DAB DEN DIG
DOT DUN DRY EAR EBB EAT ERE EYE EGG FAN
FED FIN FOX FUN FOR GAP GEM GIN GOT GUY
GNU HAT HER HIM HOW HAS HOT IN ICE ILK

Beginning again with the letter "A" the same letters, figures and conventional signals are repeated over and over again to the end of the tape, and in the same order. The alphabet, numerals and conventional signals are repeated three times. Both sides of the tape are exactly alike. It will be noted that the foreign characters are omitted.

Place tape No. 1 on the Instructograph, as shown by Figure No. 1, wind the machine fully and regulate the speed to a slow movement. Have the list of the characters handy, and immediately after the machine makes a letter or character, you make it on the key. Try to imitate the machine's sending, paying particular attention to the sound of them. To begin you will experience some difficulty making the letters before the machine makes the next one, but a little practice will enable one to make most of them twice in the space allowed. If you should make them on the key at the same time that the machine is making them, the result will be a conglomerated string of sounds and make nothing that may be understood.

CONTINENTAL MORSE CODE GROUPS

Group 1

E.	●
I	● ●
S	● ● ●
H	● ● ● ●
5	● ● ● ● ●
Error	● ● ● ● ● ●

Group 2

T	▬
M	▬ ▬
O	▬ ▬ ▬
Ch	▬ ▬ ▬ ▬

Group 3

A.	● ▬
U.	● ● ▬
V	● ● ● ▬
4	● ● ● ● ▬

Group 4

W	● ▬ ▬
J	● ▬ ▬ ▬
1	● ▬ ▬ ▬ ▬

Group 5

N	▬ ●
D	▬ ● ●
B	▬ ● ● ●
6	▬ ● ● ● ●

Group 6

G	▬ ▬ ●
Z	▬ ▬ ● ●
7	▬ ▬ ● ● ●

Cipher

Group 7

K	▬ ● ▬
R	● ▬ ●
L	● ▬ ● ●
F	● ● ▬ ●
Y	▬ ● ● ▬
Q	▬ ▬ ● ▬
P	● ▬ ▬ ●

Group 8

X	▬ ● ● ▬
2	● ● ▬ ▬ ▬
8	▬ ▬ ▬ ● ●
3	● ● ● ▬ ▬
9	▬ ▬ ▬ ▬ ●
C	▬ ● ▬ ●

Fig. 1.

At this time particular attention should be paid to making the characters perfectly, just as made by the Instructograph. As an illustration, the letter "A" is composed of a dot and dash, ● ▬, but if made with a slight pause between the dot and dash, ● ▬, it would be read as E T. The same is true with the letter "N." It is composed of a dash and dot, ▬ ●, but if made with a slight pause between the dash and dot, ▬ ●, it would be taken for T E.

Probably the most common difficulty beginners have, is to make the dot or dots following the dash, properly and without pause. This is occasioned by un-

Second Side:

AMASS	ADMIDST	AMISS	ANODE	NEAT NOME NOTED
CYCLONE	COCOA	CACHE	CACTUS	CADUCITY
CALORIFIC	CAMBRIC	CARDIAC	CATCH	CHICORY
CHICKEN	CHOCOLATE	CLOCK	COCKLE	CACAO
COMMENCE	CUCKOO	CUTICLE	CYCLE	COMMERCE
FIFTY	FARTHING	FORFEIT	FLIER	FORGE FRAIL
FRAY	FREAK	FRITTER	FULLY	FURBISH FURL
FURROW	FUTILE	FUSE	FURTHEST	FUSTIAN
FURTHER	FUNNY	FYKE	LABIAL	LANDLORD LEGAL
LEGALLY	GENESIS	GOAD	GOAT	GONG BEDASH
BOMBAST	MENTION	YACHT	YULE	YAWN YAWL
YELL	YELK	YEOMAN	YARD	YESTERDAY
YONDER	YOUTH	YEAST	YARROW	YAK YAWN
YOUNG	YEA YOKE	YORE	LONELY	LOYAL LOWLY
LORDLING	LULL	LUNLAR	LUSTILY	LUCULENT
LULLABY	LUNAR	KAFIR	KENNEL	KHEDIVE
KHAN	KINDRED	KNEAD	KNIGHT	KNOCKER KNOW
KNUCKLE KNURL KNIFE KORAN PALPITATE PAMPHLET				
PANOPLY	PANTAGRAPH	PAPOOSE PAPACY		PAPER
PAPIST	PERPETRATE			

SENDING PRACTICE: Sending practice should be continued zealously. No danger of overdoing it. You will never be able to send as fast and smoothly as you would like, even if you become a first class sender, after you are in the actual work.

The words contained in tape No. 4 should be sent repeatedly, as well as other words which may be taken from a paper or magazine. Continue to keep your sending down to the speed you can receive. It is easy to get speed, but difficult to send smoothly and evenly.

ERRORS IN TRANSMISSION: At this stage of the work it is necessary to bring up the question of making errors when sending. Naturally errors are made in sending—a word may be omitted, misspelled, a line skipped in reading the copy, or numerous other causes for sending, or starting to send, a word incorrectly. Such errors must, of course, be corrected by the sender in order that the operator receiving the matter may get his copy written just as it should be.

When an error is made in sending, it is the usual practice to correct it in the following manner. Immediately upon discovering the error, the sender would make the error signal (a succession of quick dots) and repeat the last word sent correctly and proceed with the message. The receiving operator

upon hearing the "Error Signal" would discontinue copying and watch for the correction. And, unless copying too close to the sender, he would probably not have written or started the erroneous word.

It may be mentioned in this connection that in the American Morse Code no "Error Signal" is provided, but the interrogation is used as such. Indeed, the interrogation is sometimes used for correcting errors in the Continental Morse, instead of the regulation error symbol. This latter practice, while probably not authorized, has most likely been introduced by operators formerly working with the American Morse Code.

Beginning with tape No. 5, and in subsequent tapes, these errors may be made, just as they will appear in actual work, and the student must look out for them, and see that his copy is not mutilated or words written over. There is no time for correcting copy while receiving a message, and it must be written down just as it is intended to be delivered to the party to whom it is addressed.

Lesson and Tape No. 5

TAPE NO. 5: Tape No. 5 consists of five letter code combinations, and is a little faster than tape No. 4. The matter on this tape reads as follows:

FIRST SIDE: Attention signal Double dash Double dash Tape No. 5. Double dash Five letter code combinations Double dash Double dash

```
XMJSE ABEFD DCKPS AJZKY HMPVJ OWEGH CRDVW ZEENI
ZLPKT CNZDZ BEYBN XPUHC QCVGF AQCMF GHTBF
NPXCD CHLMA YQESA OPWRT QTEYR ZXFHU CVBHF
DFREG ZYCDS ATFSM OYTOD ZTYGS BNIHD HMPVJ
DNCAI SCNCO OHSEL GANGW TTVGX LMOBD
GNMXC RACTM LMPKJ AISTN FCHNO KOIRT MCKOD
OIRYT JKOUI BNJKM BNHYT BHGTY CNZDZ SZDHS
SVUMH DHAKX HMPBJ OWGEH BNZBI NJIZQ SGMKP
JZZBB TGYGX DVNTA BHQAL ZTBNR HPSHO
SLNOH JIORU ALOSR OIPUI NMKJH NJKIU MJKHY
NJMKU AQCMF CSBSF LYWAZ YREUR DMSNS CEDEU
XFZTS DLXXS NBFLO TUOGR GBFAG FHILJ DPOLN
BQZTG TWHCL OFLMO PCHNJ DJIET VNFJK BXGRE
BFGDE LKOJU LOPIU LOIKU DSTCD WZZAA AGXGE
WTRQA VJXZT AZACB SQEDK ZJVPB GSCLP BSSHS
ERVTG FLAWA AQEER MXFQL GFLYU NCOAL SLNOH
OPWRT RTYED MKLUI DGTRE MKIJU MJKLO MJKIU
CDFHW VBRCS ZQQZM VBGLP GSABF SWCLX ASBUF
MSCQA End of Message
```

SECOND SIDE: Attention signal Double dash Double dash Tape No. 5 Double dash Double dash Five letter combinations Double dash Double dash

```
BZCNS ZXMVU EOMHT SSCGW WNAXB LPBCZ VNGAL
BVABW UQUAL GALTI WYCBI CMBJC FNCLH SHVSH
KIFHR NHJUT MNJKI YCVFD NJKHT OWGEH GDQDS
RODGU GHGWP CQRYV BDSCN DRGCM RFEPK CYFTD
LTWEF PLSKA HNCFL CHOPF JKDIE OPRYT CGDET
VBNHT NHJUY POIUY MRXXZ AQFUZ OZHDW ONCAI
SQCLX NBGLA KSQPT RVNAQ XCABH OLTDS RTVKH
```

CONTINENTAL MORSE CODE AND CONVENTIONAL SIGNALS

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z
Ä (German)
Á or À (Spanish–Scand.)
CH (German–Spanish)
É (French)
Ñ (Spanish)
Ö (German)
Ü (German)
1
2
3
4
5
6
7
8
9
0

Period
Semicolon
Comma
Colon
Interrogation
Apostrophe
Hyphen
Bar indicating fraction
Parenthesis
Inverted commas
Underline
Double dash
Distress Call
Attention call to precede every transmission
General inquiry call
From (de)
Invitation to transmit (go ahead)
Warning—high power
Question (please repeat after ------) — interrupting long messages
Wait
Break (Bk.) (double dash)
Understand
Error
Received (O. K.)
Position report (to precede all position messages)
End of each message (cross)
Transmission finished (end of work) (conclusion of correspondence)

CONTINENTAL MORSE CODE INSTRUCTION

These instructions include the use of ten double perforated tapes. That is, each tape contains two rows of perforated characters, reading from opposite ends, which permits both sides being run by turning the spool over after it has passed through the machine, and running it again in the same direction, without having to rewind it as is necessary with an automatic piano roll, for instance.

The tapes are graduated from a very slow sending tape to exceptionally fast ones. Besides the tapes being made from very slow to very fast, by reducing the space between the letters and words, the speed of their passing through the machine may be regulated by use of the speed regulator.

It should be remembered, however, that it is best to practice with the slower tapes until the faster ones may be run normally, as running a fast tape too slow, (or any tape for that matter) distorts the sound to the extent that the characters are not made properly.

A list of the Continental Morse code and conventional signals is shown on page 21, which may be used in connection with these lessons.

Also to facilitate learning the code characters, they have been arranged in eight groups, as illustrated on Page 22. The first group being all dot letters the second and all dash letters, and so on. It is recommended that each group be practiced separately, beginning with the first group and practice on it until the sound of it is perfectly familiar. Then pass to the next.

In practicing dot letters it is a good plan to begin as follows: Before beginning to form the characters themselves just make the dots. Start with making one each second until you have made about 20, being careful that each is clear-cut and quick, and made by a distinct motion of the wrist. Stop and rest a moment, and then try two each second, then three and so on until you have attained a speed of about 250 per minute. The dash letters may then be taken up.

The dash letters should be practiced just as carefully. Remember that a dash is presumed to be three times as long as a dot, and naturally the dashes may be made just one third as fast.

Listening to the Instructograph make the letters will soon teach the student just how all letters should be made, and little trouble will be experienced if the student takes pains to make the letters just as they are made by the machine.

Lesson and Tape No. 1

TAPE NO. 1: This tape is what is commonly called the "Sending" tape. That is, it is intended for use by those with no knowledge of how the letters and characters should be made. The letters, numerals and conventional signals are made with sufficient space between each for the student to make them on the key after the machine makes them correctly. The characters reproduced by tape No. 1 are as follows:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
1 2 3 4 5 6 7 8 9 0 Period — Comma — Interrogation — Double Dash (Bit) (break) — From (de) — Attention call, to precede every transmission — General inquiry call — Invitation to transmit (go ahead) — Error — Received (O. K.) — End of each message (cross) — Transmission finished (end of work—conclusion of correspondence).

STUFV	YNCHA	OFISU	OIDUR	ZGFYE	DFREG	BGFRT
HGFDS	ESJMZ	DFEBA	SPKCD	YKZJA	JVPMH	HGEWO
WVDRC	INEEZ	TKPLZ	ZDZNC	NBYEB	CHUPX	FGVCQ
FMCQA	FBTHG	DCXPN	AMLHC	ASEQY	TRWPO	RYETQ
UIHFXZ	FHBVC	GERFD	SDCYZ	MSFTA	DOTYO	SGYTZ
DHINB	JVPMH	IACND	OCNCS	LESHO	WGNAG	ARBQOY
XGVTT	DBOML	CXMNG	MTCAR	JKFML	NTSIA	OXHCF
TRIOK	DOKCM	TYRIO	IUOKJ	MKJNB	TYHNB	YTGHB
ZDZNC	SHDZS	HMUVS	XKAHD	JBPMH	HEGWO	IBZNB
QZIJN	PKMGS	BRZJJ	XGYGT	ATNVD	UTDGM	IAQHB
RNBTZ	OHSPH	HONLS	UROIJ	RSOLA	IUPIO	HJKMN

End of Message.

Tape No. 5 also provides a great deal of practice. It should, of course, be run in the usual manner, and regulated to the speed best suited to the student's ability to copy. It should be remembered, however, that in order to get the maximum results in practice to always regulate the machine so that it will send at a speed that will "crowd" the student just a little.

' It might be mentioned here that in sending code combinations, and they are used very extensively in radio work, every character must be made perfectly. No guessing with this class of matter. And, more space should be left between the letters and considerably more between the combinations. Make every letter perfectly and space correctly.

When able to copy this tape at the rate of 12 to 15 combinations per minute good progress has been made, and No. 6 tape may be taken up. Both tape Nos. 4 and 5 should be reviewed frequently, as they will both afford excellent practice up to the time this training is finished.

SENDING PRACTICE: Practice sending the five letter combinations as reproduced by tape No. 5, as well as the four letter combinations on tape No. 4. Watch the sending for smoothness. Care must be taken to avoid making one letter quick and the next slow, and special care should be used to see that the spacing is uniform, the same between all letters. It naturally follows that uniform spacing should be used between all words. Nothing but constant careful practice will make one a good sender. Try to be one, as they are the exception to the rule.

It assists one materially in his sending practice to place a tape on the machine and simply sit back and listen to its sending. The spacing is absolutely correct and the letters are made as they should be. This practice teaches one to distinguish shortcomings in his own sending, and correction naturally follows.

Lesson and Tape No. 6

TAPE NO. 6: Tape No. 6 consists of numerals entirely, divided into combinations of five. Students often experience trouble in sending and receiving the numerals and this tape will afford sufficient practice to correct this trouble if it is encountered.

Only the complete contents of the first five tapes are reproduced in the lesson material. From No. 5 on the student can easily get the matter from the

tapes when they are run on the machine, and it is considered better teaching logic to reproduce only a sample of the matter. Just enough to give a comprehensive idea of it.

Following is a list of a few of the numerals contained on the first side of tape No. 6. The other side is exactly the same, except different combinations, of course:

FIRST SIDE: Attention signal Double dash Tape No. 6 Double dash
Numerical Code Double dash Double dash.

```
12345 02397 9876 32561 26274 93461 10807 30765 55661 96081 38990
87463 43295 32760 78261 36386 06731 54545 59364 37254 23492 54863
93814 72832 36370 77655 27561 46789 42391 46743 46821 72654 84736
50375 32157 85841 67890 98763 76834 54827 14960 46803 36321 32176
```

And so on to the end.

SENDING PRACTICE: It will be well to practice sending numerals, particularly combinations of them, until you are able to make them uniformly and with correct spacing.

Continual sending of the numerals gets to be rather irksome, and it is recommended that such practice be divided between the numerals and words or sentences. Always note the quality of the sending rather than the speed of it. Again, it will serve as good practice to listen when the Instructograph makes the numerals, as it makes them perfectly and as they should be made.

You should be sufficiently advanced in the sending at this time to take up the sending of newspaper and magazine articles or other matter that appeals to you. Do not allow yourself to get in the habit of sending without realizing that it should be sent so that it may be easily read.

Lesson and Tape No. 7

TAPE NO. 7: Tape No. 7 consists of five character letter and figure mixed code combinations. It is probably the most difficult of the set of ten. Indeed, it is used more by students in the preparation for their Government Examination, than any other of the number.

Following is a list of a few of the combinations contained on the first side of tape No. 7. The second side consists of the same class of combinations.

FIRST SIDE: Attention signal Double dash Tape No. 7 Double dash
Mixed Code Double dash Double dash.

```
H3STM   BSTJD   6VU5H   5H545   WHCNP   BV65H   SES4V
T89B4   12BAS   CHPNJ   BCKMP   7689W   EUNB9   HS20K
S5BH5   5HSDW   CMKLQ   46B7I   BD6UV   QWE4L   C875W
SH4B6   ONFQA   984L8   ABLXW   GBC87   EPL84   943DV
SVBH5   AZM36   2199W   SF136   HSTM7   SBDGS   4AQSZ
POTL8   SUGBW   S4VB6   36834   13494   H8765   KNCTW
NWRK7   HLT97
```

Practice with this tape should be continued indefinitely up to the point of completing the training. After it is mastered so that it may be copied at a speed of 15 to 18 words (5 characters to the word) per minute, it may be put aside for a while for tape No. 8, but return to it frequently as you will find no better practice.

SENDING PRACTICE: There is little that may be added in the way of instruction in sending, other than to urge continued practice. At this stage the sending may be speeded up somewhat, although speed is secondary to good clear and smooth sending. Use newspaper and magazine articles for copy, and

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To apply the "Dit-dah" method to the American Morse characters simply separate the dits by a slight pause in connection with the "space" letters. As an illustration, the letter "C" would be as follows: ditdit dit (.. ..)—a slight pause between the first two and third dit.

It is hardly necessary to mention that in learning the Continental Morse code a buzzer of oscillator should be used, and for the American Morse, a key and sounder. It might be stated in this connection, however, that when one learns both codes it will materially assist in avoiding confusion of the codes by always using the proper equipment for practice. That is, never use an American Morse tape on the Instructograph to work the buzzer or oscillator, and never use a Continental Morse code tape for the telegraph instrument. In this way one learns to always associate the proper code with the sounds produced in the respective codes in actual work.

CODE SELECTED: The lesson material and machine practice instructions in connection with the Continental Morse and American Morse codes follow in the order named, under the captions "Continental Morse Code Instruction" and "American Morse Code Instruction." The instructions pertaining to the code not being studied should be completely disregarded, until that code is taken up and the proper tapes secured.

SELECTION OF CODE

Everything contained in these instructions up to this point pertains to either code—Continental Morse (wireless) or American Morse (wire) telegraphy.

At this point it should be determined which code the student desires to take up first, and the one selected should receive his undivided attention to the exclusion of the other for the time being.

ONE CODE ONLY: A great deal of time would be wasted if both codes were attempted at the same time. But, when one is an operator in either code, and that code is thoroughly established in the mind, the other code may be easily learned in a short time. One knows how to telegraph, and the mind is trained to read the characters by sound. To acquire the other code is, therefore, simply a case of learning the other code characters which are different, and applying them to the work.

Acquiring either code is a very similar process for the beginner. Each calls for approximately the same amount of practice and training. The American Morse is a little shorter, and possibly a little more difficult.

EXPLANATION OF DIFFERENCE: The Continental Morse (wireless) code is composed of dots and dashes only. There are no space characters. See the chart on page 22. The reception in actual work is by means of an amplified flute-like note produced by an oscillating radio tube, and heard through head phones or a loud speaker. In learning the code, however, a "buzzer" is sometimes used which produces a sound, which in some instances, resembles the note produced by the oscillator. When the key is depressed, or the circuit closed, a continual note is heard. Therefore, the dot is made by a quick momentary closing of the key and the dash is made by a continued depression of the key just three times as long as used to produce the dot.

Listening to the Instructograph make the Continental Morse characters either on a buzzer or an oscillator unit, will quickly teach one to make them correctly and accurately.

The American Morse (wire) Code is composed of dots, dashes and spaces. See chart on page 35. The reception is by means of a metallic sound produced by a telegraph sounder. The dots are made by a quick metallic click of the sounder produced by momentarily closing the circuit with the key. The dash is produced in exactly the same way except that the metallic click is prolonged three times as long as in making the dot, by the simple process of closing the circuit with the key just three times as long. The space is simply a momentary pause between the dots. All space letters are composed of dots only. C-R-O-Y-Z-& (short and) are the space letters. The letter C, for instance, would be just like four dots (....) with the third omitted (.. .) The letter R the same with the second dot omitted (. .) and so on through the list.

Listening to the sound of the American Morse characters as made by the Instructograph will clearly indicate how all letters, figures and symbols are made. It is a beautiful and rapid code and well worth the while of every radio operator to learn.

Of the 36 letters and numerals, 16 are the same in both codes; ten are the reverse of others, and ten are entirely different. Therefore, it is manifest that in learning the second code it is only necessary to learn a limited number of new characters.

The Continental Morse Code is now in more demand than the American Morse, and if one has no special preference it may be well to take up the former first, and the latter at some future time. Both are necessary, however, in order for one to procure an operator's Commercial Extra First Class License.

never overlook the fact that every character must be made readable, otherwise it is useless to send it.

Lesson and Tape No. 8

TAPE NO. 8: Tape No. 8 consists of miscellaneous matter as follows:

FIRST SIDE: U. S. Weather bulletins or forecasts such as are sent broadcast to sea through naval coast radio stations at certain times, varying with the locality. The first two bulletins—in code, which we cannot interpret, of course, reads as follows:

```
U S W B   S 96465   T 91674   D B94696   H 99886   C 01214
          K 02622   P 03613   B 00065
U S W B   DU96826   M 97635   U 00443    G 96046   CH 05265
          L 00513   D 00842   V 01054    F 01656
```

The other bulletins are similar and continue to the end of the first side of the tape.

SECOND SIDE: This side contains disconnected phrases which teach the student to keep his mind on the actual signals coming and not "guess ahead," as there is no way to anticipate what is coming. The first sentence reads as follows:

Seven unlucky men jeopardized the safety of all on board altho with extra care and uniformity.

Similar matter continues to the end of the second side of the tape.

SENDING PRACTICE: It is recommended that the matter copied from Tape No. 8 be used when practicing sending, and great care should be used to see that it is plain, clear and even, so that it could be copied regardless of its disconnected character. Other matter may be used in connection with practicing sending at this time. The only important thing is that sufficient practice may be indulged in, and that extreme care is used in sending correctly.

Lesson and Tape No. 9

TAPE NO. 9: Tape No. 9 consists of typical radiograms such as would be sent by steamship and land stations in actual work. All commercial companies do not use the same message form, but generally speaking there are four parts to any commercial message as follows:

1. The preamble (the business of the message)
2. The address (to whom sent)
3. The text of the message (the contents)
4. The signature (name of the person sending it)

Punctuations in messages are usually omitted, and when they are sent, upon specific request, they are charged for as words. The first message on the first side of tape No. 9 reads as follows:

```
(P NR 1) SS Baltic   Wds 15 Rdo Fld 9 35 A M   (To)
Melissa Shute
1356 Baltimore Avenue
White Plains N Y   (Double dash)
Will expect a donation from the family soon (Double dash)
                (Sig) Jack
```

The message would be sent substantially as shown but the operator receiving it would omit the words or characters inclosed in brackets from his copy, as they are simply signals for the receiving operator's information and would be unintelligible to the party receiving it. Similar radiograms continue

SENDING SPEED: It is a good rule to never try to send faster than you can receive. Make all dots and dashes clear and distinct and very slowly to begin. The dot, of course, is made by a quick contact, but the dash should be prolonged, even more than is really correct, particularly at the start. There is a tendency among beginners to make the dashes too short, particularly those preceding dots. Speed in sending will come with practice and should be very gradual.

Additional information regarding making the letters properly will be given in connection with practicing with the Instructograph.

"BUG" SENDING: Quite a number of mechanical sending devices are manufactured and are excellent for easy and fast sending. They are used largely by experienced operators and are considered by many as quite indispensable. The student, however, has no call or need to procure or use such devices until he has quite thoroughly mastered sending with the regulation telegraph key. In fact, the introduction of an automatic sending device would likely prove a handicap to learning key sending as it should be mastered.

"Bug" sending is easily picked up in a few days of practice, after one has become an efficient operator, and it is absolutely necessary that one learn to send correctly with the standard telegraph key.

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to the end of the tape. The reverse side of the tape contains the same class of matter.

This tape will afford quite a lot of good practical practice and should be used even after the matter is more or less familiar.

COPYING BEHIND: All efficient operators copy a little behind the sending. That is, they would probably not write down the first word sent until the sending operator had sent one or two additional words. The number of words one is able to copy behind varies with the class of matter being copied and the ability of the operator, but a couple of words will be quite enough in ordinary work.

The advantage of copying behind is that one learns to have the full text of the matter being sent in mind instead of just one or two words. One is able to attain greater speed and is less liable to make an error. Again, should the sending operator make an error and correct himself by making the error signal and repeating a few words, if copying too close the receiving operator would have the erroneous word written, or at least begun, and would have to erase or make another copy.

A very good way to acquire the habit of copying behind is to begin the practice with words and messages which are more or less familiar, and one has some idea of what is coming. After learning to copy a few words behind with this familiar matter, try it on messages with which you are not familiar. Continued practice only will produce the desired results.

The simpler and easier the matter the greater number of words one is able to copy behind. One word, or 3 or 4 letters is considered very good in difficult code combinations.

SENDING PRACTICE: Practice sending the matter copied from tape No. 9. Be very careful about the spacing and try and send as near like the Instructograph as you can. Speed up a little, but gradually, and always remember that accuracy is far more important than speed at this time. Bear in mind that just such messages as these reproduced by tape No. 9 are what you will have to handle when you are actually engaged in the work.

In practicing sending these messages try to imagine yourself sending from a ship at sea, and that another station's operator is copying your stuff. Again, one must bear in mind that conditions are not always the best, and the sending even when good does not always carry, clear, and the better and firmer it is sent the better it will reach its destination under adverse conditions.

Lesson and Tape No. 10

TAPE NO. 10: Tape No. 10 is the last of this training and when you have finally concluded practice with it you should be an operator in every sense of the word, so far as the code is concerned. The matter reproduced by tape No. 10 consists of disconnected material similar to that given to candidates for a Government radio operator's license. The first paragraph of the first side of the tape reads as follows:

Standard 903 sent 1 ¾ 6000 to Frank G Sullivan
323 Plainview Avenue Erie Pa summer, SOS SOS SOS NAF NAF
NAF DE NAD NAD NAD copper wheat pfd 33 ⅞ 1919.

This class of matter is continued through both sides of tape No. 10. Practice with this tape should be continued indefinitely, or until the student is able to pass the Government test. All tapes from No. 4 to No. 10 inclusive should be reviewed occasionally, or as long as necessary. Indeed, telegraphy is like music. One never gets so good but what continued practice is necessary. The Instructograph will afford such practice.

SENDING

Figure 3, page 16, shows the correct position of the forearm and fingers in relation to the telegraph key. It is recommended that the key be fastened far enough back on the table to allow the elbow to rest on the table. One should sit erect with both feet on the floor. In other words, assume the most comfortable working position possible.

The movement of the arm should be free and unhampered, and the energy required to manipulate the key should be from the forearm and wrist and not from the hand and fingers. The wrist should go downward when each dot or dash is made. The fingers should rest easily upon the key with no trace of rigidity.

KEY AND ADJUSTMENT: In actual radio telegraph work a heavy key is used, and one that has heavy contact points. In practice work, however, any ordinary key will answer just as well.

FIGURE 3. Showing correct position of fingers, hand and wrist in sending with an ordinary telegraph key. The key should be set far enough back on the table to allow the elbow to rest comfortably on the table in an easy and natural position. Detailed information in connection with "Sending" will be found on page 16

Adjustment of the key is largely a matter of individual preference. One apparently do better and easier sending with a rather tight spring tension, and another prefers it light. The same is true of the space between the contact points. Some prefer very little space between the points and others wish plenty of room. The best way to begin is to adopt a "happy medium." Leave about one thirty-second (1/32) of an inch between the points with a moderate spring tension, just enough to raise the key lever quickly when the pressure is removed. Then, as you progress in the work, and feel the necessity, adjust the key to the point where you get a maximum of result with a minimum of effort.

The hold on the key is similar to holding a pen holder in writing. The old copy-book rule was, "hold the fingers in a certain position and point the holder over the right shoulder." Not one in a thousand holds a pen in exactly that way, but most of us have adopted a somewhat similar style. Therefore, hold the key as near like the illustration as you can, but have it natural and easy.

16

SENDING PRACTICE: Keep in mind that sending is an important part of your code examination for an operator's license. Good sending always indicates a good operator. The other fellow can't tell what conditions you are receiving under—how it's coming to you, and can't judge your receiving ability accurately, and will give you the benefit of the doubt. But, he can judge your sending all the time and judge it right.

While there is presumed to be no service in connection with these instructions we will be glad to answer questions, to the best of our ability, if there is any point upon which the student is not entirely clear. Again, if further practice should be necessary, which is doubtful, after the present tapes are disposed of, other tapes with different matter may be procured from the Instructograph Co.

The section captioned "Miscellaneous," at the close of the "American Morse Code Instructions" following, will be found to be of particular interest to radio operators, or those desiring to engage in that work.

AMERICAN MORSE CODE INSTRUCTION

These instructions include the use of ten double perforated tapes. That is, each tape contains two rows of perforated characters, reading from opposite ends, which permits both sides being run by turning the spool over after it has passed through the machine, and running it again in the same direction, without having to rewind it as would be necessary with an automatic piano roll, for instance.

The tapes are graduated from a very slow sending tape to exceptionally fast ones. Besides the tapes being made from very slow to very fast, by reducing the space between the letters and words, the speed of their passing through the machine may be regulated by use of the speed regulator.

It should be remembered, that it is best to practice with the slower tapes until the fast ones may be run normally, as running a fast tape too slow, (or any tape for that matter) distorts the sound to the extent that the characters are not made properly.

A list of the American Morse Code and conventional signals is shown on page 35, which may be used in connection with these lessons. Also to facilitate learning the code characters, they have been arranged in eight groups, as illustrated on page 36. The first group being all dot letters, the second all space letters, the third all dash letters, and so on. It is recommended that each group be practiced separately at first beginning with number 1 group and practicing on it until the sound of each is perfectly familiar. Then pass on to the next.

In practicing the dot letters it is a good plan to begin as follows: Before beginning to form the characters themselves, just make the dots. Start with one each second until you have made about 20, being careful that each is a quick, clear-cut sound, and made by a distinct motion of the wrist. Stop and rest a moment and then try two each second, then three and so on until you have attained a speed of about 250 per minute. The dash letters then may be taken up. The dash letters should be practiced just as carefully. Remember that a dash is presumed to be three times as long as a dot, and naturally the dashes may be made just one third as fast.

Listening to the Instructograph make the letters will soon teach the student just how all letters should be made, and little trouble will be experienced if the student takes the pains to make the characters just as they are made by the machine.

Lesson and Tape No. 1

TAPE NO. 1: This tape is what is called the "Sending" tape. That is, it is intended for use by those with no knowledge of how the characters should be made. The letters, numerals and conventional signals are made with sufficient space between for the student to make them on the key after the machine makes them correctly.

The characters reproduced by tape No. 1 follow:

First Side:

A A B B C C D D E E F F G G H H I I J J K K L L
M M N N O O P P Q Q R R S S T T U U V V W W
X X Y Y Z Z . . 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 0 0
. . , , ? ? . .   Beginning again with the letter A the same letters, figures and punctuation marks are repeated over to the end of the tape, and in the same order. Both sides of the tape are exactly alike.

Place tape No. 1 on the Instructograph, as shown by Figure No. 1. Wind the machine fully, and regulate the speed to a slow movement. Have the list

TIMING OF CHARACTERS: In the telegraph characters a dash is equal to three dots; the space between the parts of the same letter is equal to one dot; the space between two letters is equal to three dots and the space between two words is equal to five dots. With these specific intervals between the characters and parts of characters, it is quite evident that timing is an important factor.

In telegraphy the dots and dashes, which make up the various characters, are of uniform length, regardless of the speed of the sending. That is, there is but one way to make the letter "A" for instance, — (Ditdah) correctly, and that is according to the specifications mentioned above. It cannot be strung out for slow sending like — (Di t   d a h). Therefore, it will be seen that speed in sending is gained by reducing the spacing between the letters and words, and not by making the characters faster or different. It is exactly the same as when teaching the alphabet to a child. The letters are pronounced as they should be. An "A" being called an A, and not distorted to an unrecognizable sound by dragging it out.

It is obvious, therefore, that in order to reproduce telegraphic characters with a specific and varied amount of space between parts of letters and words, that proper timing in making them is indispensable. Proper timing (spacing) is just as important in telegraphy as in music. A student of the piano, for instance, will work on an exercise for hours and hours counting, 1-2-3, 1-2-3, 1-2-3, in order to get the proper "rythm" to the music. The same is just as necessary in telegraphy. In telegraphy, however, one does not ordinarily count, 1-2-3, 1-2-3, as in music (although there is no reason why it could not be done) but instead, starts to spacing sufficiently by sending very slowly, and gradually decreasing the spacing with the increased speed in sending, to a perfect "rythm" of time, and incidentally excellent sending.

Improper timing or spacing accounts for ninety per cent. of all poor sending of telegraph operators. And, incidentally, real good senders are seldom encountered. As an illustration to show what havoc improper spacing may cause, a sentence is reproduced below, once improperly spaced and again properly spaced:

The reare thousands ofrad ioamateur soperati ngall thet ime

There are thousands of radio amateurs operating all the time

It is almost impossible to read the first line, while the second is read at a glance. Yet, they are exactly the same, except the first is incorrectly spaced. This is a slightly exaggerated illustration, of course, but in fast sending there is but a small fraction of a second's space, even between the words, and with this in mind the importance of proper spacing may be more clearly appreciated.

4. PERSISTENCY: Anything worth having is always hard to get, otherwise there would be no particular incentive to possess it. Some things, such as digging a ditch, for instance, are quite easily learned, while acquiring the art of telegraphy is more difficult.

One's persistency, therefore, is a material factor in determining whether one is to become an operator or a ditch digger. Only about one in ten carries out what he undertakes, regardless of whether it is conducting a business, studying a course of instructions or some similar endeavor. Except, of course, digging a ditch, in which occupation practically all may succeed.

If you have made up your mind to become an operator, BE ONE. Let nothing stop you. Get the "I WILL" spirit and succeed. Pass up some of the passing frivolous entertainment for a while, in order to more fully enjoy things really worth while, after you are established.

The Instructograph and these instructions supply you with everything needed to make you an expert operator, except the WILL. You will have to furnish that.

1. PSYCHOLOGICAL ATTITUDE: Practically everything one does, other than the things that are instinctive, such as self preservation, getting hungry, thirsty or sleepy, for instance, is the result of developing instinct by education. Broadly speaking, education is learning certain things usually by the simple process of repeating them over and over again. When one learned the multiplication tables, there were no short cuts nor "simple methods." It was a case of saying and thinking them over and over until they were indelibly impressed upon the mind.

The same is true with physical accomplishments. Anything done with the hands or feet is a form of physical education and is accomplished in exactly the same manner, doing it over and over again.

The art of learning telegraphy is both an intellectual and physical development, and it is a matter of education by repeating and doing specific things over and over again.

Beginning the practice and study of telegraphy one's efforts are naturally directed by the conscious mind, and as a result are slow and laborious. Every thought and movement must be directed specifically and controlled by a mental effort. But, when the processes have been repeated a sufficient number of times, the efforts are then directed by the sub conscious mind, and without the aid of the conscious direction. When that state of perfection is reached it is commonly called "SKILL."

As telegraphy involves both mental and physical processes, and at the same time, it naturally follows that absolute coordination between the mind and hand is necessary. When the mind sends forth an impulse to perform a certain movement with the hand, and the nerves and muscles of the hand fail to obey such impulses instantly, proper coordination is lacking. But when the nerves and muscles of the hand respond instantly and without conscious direction, coordination is manifest, and efficiency results.

Certain letters and characters of the telegraph code will give students more trouble than others, just as some words are hard to learn to spell correctly for some. What is easy for one may be hard for another. Probably every letter and numeral in the code has been the special concern of someone. There is no apparent accounting for this fact, nor should it cause any worry. It is incidental to learning, and so far as is known, the trouble never extends beyond the student stage.

There is but one way to remedy this fault, and that is to give such letters and characters special and continual attention until they are as easy as the others.

2. REGULARITY OF PRACTICE: It is a well recognized fact that the regularity of habit in any endeavor is far better than the "hit and miss" method. In the practice of telegraphy better results will be obtained by setting aside certain periods of the day for practice. Just what time will be available for the work may be determined, and it is recommended that the schedule arranged be followed as closely as consistent.

Never attempt to practice continually long enough to become exhausted. Fifteen minutes of concentration and intensive practice is enough for one sitting. That is, at the end of that time it is best to get up, move around and do something else for a few minutes, and when thoroughly relaxed, try another fifteen minute period.

If one is employed, and practicing during spare time, six to eight hours per week is considered quite sufficient. This time may be divided to suit the student's convenience. If all the student's time is devoted to the work, as many fifteen minute periods may be employed as desired, so long as one feels that progress is being made. With too constant application the mind seems to become confused and ceases to function properly, and before that stage is reached some rest should be indulged in.

AMERICAN MORSE CODE AND CONVENTIONAL SIGNALS

Letter/Figure	Code	Conventional Signal	Code
A	· —	Period	· · — — · ·
B	— · · ·	Comma	· — · —
C	· · ̣ ·	Interrogation	— · · — ·
D	— · ·		
E	·	Dollars	· · · — · · ·
F	· — ·		
G	— — ·	Semicolon	· · · — · ·
H	· · · ·		
I	· ·	Dash	· · · · — · · · ·
J	— · — ·		
K	— · —	Paragraph	· — · — ·
L	⎯		
M	— —	Capitals	· · · — · —
N	— ·		
O	· ·	Decimal point	— · · — ·
P	· · · · ·		
Q	· · — ·	Cents	· · · —
R	· · ·		
S	· · ·	Colon	— · — · ·
T	—		
U	· · —	Colon dash (:—)	— · — · · — · · · ·
V	· · · —		
W	· — —	Colon quotation (:")	— · — · · · — · · — ·
X	· — · ·		
Y	· · · ·	Hyphen	· · · · — · · · ·
Z	· · · ·		
&	· · · ·	Beginning quotation	· — · · — ·
1	· — — ·	Ending quotation	· — · · — ·
2	· · — · ·	Apostrophe	· · · · — · · · · ·
3	· · · — ·		
4	· · · · —	Brackets	— · — · — ·
5	— — —		
6	· · · · · ·	Beginning parenthesis	· · · · · — · · · · ·
7	— — · ·		
8	— · · · ·	Ending parenthesis	· · · · · — · · · · ·
9	— · · —		
0	⎯⎯	Pound sterling	— · · · — · · · ·
		Shilling	· · — · ·
		Pence	· · — · ·

of characters handy, and immediately after the machine makes a letter or character, you make it on the key and imitate the sending of the machine. To begin you will experience some difficulty making the letters before the machine makes the next one, but a little practice will enable you to make most of them twice in the space allowed. If you should make them on the key at the same time that the machine is making them, the result will be a conglomerated mess of sound that is unintelligible.

At this time particular attention should be paid to making the characters perfectly, just as made by the Instructograph. As an illustration, the letter "A" is composed of a dot and dash, ·—, but if made with a slight pause between the dot and dash, · —, it would be read as E T. The same is true with the letter "N". It is composed of a dash and dot, —·, but if made with a slight pause between the dash and dot, — ·, it would be taken for T E.

AMERICAN MORSE CODE GROUPS

Group 1	Group 2	Group 3	Group 4
E ·	C ·· ·	T ▬	A · ▬
I ··	R · ··	L ▬▬	U ·· ▬
S ···	O · ·	O · ·	V ··· ▬
H ····	Y ·· ··	M ▬ ▬	4 ···· ▬
P ·····	Z ··· ·	5 ▬▬▬	
6 ······	& · ···		

Group 5	Group 6	Group 7	Group 8
N ▬ ·	W · ▬▬	G ▬ ··	J ▬·▬·
D ▬ ··	1 · ▬▬·	K ▬ · ▬	Q ··▬·
B ▬ ···	2 ·· ▬··	7 ▬▬ ··	X ·▬··
8 ▬ ····	3 ··· ▬·	9 ▬▬ ·	F ·▬·

Probably the most common difficulty beginners have, is to make the dot or dots follow the dash properly and without pause. This is caused by unconsciously allowing the key lever to raise before beginning the dot or dots. Normally one starts to make all characters with the key lever up. Hence, the tendency to allow the key to raise to a normal position. But, when making dots following a dash (of the same letter) they are made from the downward position of the key. That is, make the one two or more dots following the dash from the downward position, without consciously allowing the key lever to raise.

Particular attention is called to the "Space" letters, C R O Y Z and & (short and). In the groups of characters on page 36, the second group is composed of these space letters and symbols and should receive careful attention, as well as be given considerable practice. As before stated, the space is simply a short pause equal to one dot. Therefore, to make the letter "O" for instance, would be like making the letter S (···) leaving out the middle dot (··). The other space letters are exactly the same, a space equal to one dot between the several dots making up the character.

Continued practice, closely following the sounds of the characters as made by the Instructograph, will soon eliminate any difficulty in making the letters correctly and properly.

Practice with this tape should be continued until the student is able to make every character correctly and easily, just as they are made by the ma-

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Repeating these sounds over a few times in connection with the dots and dashes will clearly indicate the practical application of these sounds to the parts of letters. The "Dit" is a quick, sharp sound, well representing the dot. The "Dah" is a prolonged sound quickly associated with the longer dash.

The student may use this sound method to good advantage in practicing letters and words he happens to see—words read in books, magazines or newspaper articles, or the lettering of signs seen while out of doors. Such practice may be indulged in at any time and under almost any circumstances. It should materially assist in impressing the "sound" of the characters on the mind.

EXPECTED PROGRESS: There is a tendency on the part of students to think that they should progress more rapidly than they are doing. That is, they are inclined to want to skip from one tape to another and try some of the faster ones. This is a great mistake, and much greater progress will be made by working with each tape until it is thoroughly mastered. The tapes are properly spaced, and gradually progressed to advance the student in the work just as he should be.

PRACTICE PERIODS: If the student is employed, or only devoting spare time to the work, it is considered splendid progress if one averages completing one tape per month. If full time is employed one tape every two weeks is as much as may be expected usually. There will of course be exceptions to this rule, and one tape may be mastered in less time than stated, and another take much longer.

IMPORTANCE OF SENDING PRACTICE: Many students, and some instructors, for that matter, seem to think that the "sending" part of the work will just naturally take care of itself, and that little attention to that part of the training is necessary. Nothing is further from the actual facts. There are more good receiving operators than there are good sending operators. Indeed, a good clear and accurate sender is a rarity. To be one is a mark of distinction, and a recognized indication of a real efficient operator. Therefore, practice sending faithfully, and as instructed in connection with the ten lesson assignments and tape interpretation.

RETARDED PROGRESS: It is doubtful if any operator ever learned telegraphy without the feeling that at some stage of the work, they were at a standstill and making but little or no progress. It usually develops, however, that it is just a last heavy pull before pitching over the top to some real gain. There seems to be no accounting for this feeling, and its remedy is somewhat similar to that of treating a "boil." Just continue to apply poultices, hard work and practice, and it will soon "break."

PRACTICE AND STUDY

In the practice and study of telegraphy there are a few vital factors which have a distinctive influence on the ultimate success or failure of the student. Indeed this may be said of almost any endeavor, but at present we are dealing with the art of learning telegraphy. These factors may be enumerated as follows:

1. Psychological Attitude.
2. Regularity of Practice.
3. Timing of Characters.
4. Persistency.

Others, of course, might be mentioned, but all come under the broad conception of the four referred to above.

producing symbols which represent letters, words, etc., and the ear is trained to read such mechanical symbols instead of a human voice. Therefore, it requires practice, and lots of it. If you expect to learn radio or wire telegraphy in a day, a week, or month, you will be disappointed. It simply is not done. But, if your desire to learn is strong enough for you to determine to practice faithfully, and carefully follow these instructions, it will, in the course of a few months, lead you to your goal.

A music instructor, for instance, gives his pupils finger exercises and outlines a regular and exhaustive course of practice, and forbids the student to attempt playing even the simplest pieces until a certain advancement has been made. The same is true with acquiring the code. Certain fundamentals must be learned. Specific practices followed and tiresome repetition indulged in, if one is to obtain the best results. If there were any short cuts, instructors who have taught hundreds, would surely know of them. The only short cuts attempted are by those with no knowledge of teaching by the most improved and advanced methods.

Therefore, if you desire to acquire the code with the least possible resistance, and become an efficient operator within the shortest possible time, follow these instructions carefully.

SOUND METHOD: It is desirable, so far as possible, to avoid learning the code characters by the so-called "visual" method. That is, memorizing that each one is composed of so many dots and dashes. Instead, it is greatly to the student's advantage to employ at the beginning the "Sound" method, i.e., learn to recognize the characters by their sound, as made by the buzzer or telegraph instrument, rather than by the number of dots and dashes.

When you hear some one pronounce the letter "A" you intuitively know instantly that it is the first letter of the alphabet and you do not have to stop to figure out that it is constructed of certain curves or angles. If you did, each letter or word spoken to you, in order for you to understand them, would have to be pronounced separately and with sufficient space between each for you to visualize their construction and interpret them.

The same is true with the code alphabet and symbols. If you had to stop and translate the characters from dots and dashes to the letters which have to be employed in transcribing them, you would be completely lost, and never be able to keep within hailing distance of the fast sending necessary in actual work. Therefore, you simply have to learn to recognize them instantly by sound or you will never become an operator. Since this is a fact, why not learn correctly in the first place?

HOW TO LEARN THE CHARACTER SOUND: About the most satisfactory way to become familiar with the sound of the characters, other than to listen to the Instructograph make them, which will be taken up in connection with the code lessons, is to repeat them over and over again by the "Dit," "Dah" method, described below, and to repeatedly make them on the key, paying particular attention to their sound as made.

THE "DIT" "DAH" METHOD: Many students find it helpful in learning the code by the sound method, and it will doubtless assist in avoiding the so-called "visual" method, to apply a voice sound to the dots and dashes, commonly called "Dits" and "Dahs." The "dit" representing the dot, and the "dah" the dash. As an illustration the first few letters of the alphabet would be pronounced as follows:

A—Dittah
B—Dahdididit
C—Dahdidahdit (Continental Code)
C—Didit Dit (American Code)
D—Dahdidit

E—Dit
F—Ditdahdit (American Code)
F—Dididahdit (Continental Code)
G—Dahdahdit
H—Dididididit

---

chine. One can not hesitate to figure out what dots and dashes comprise them. Consistent practice with this tape is the basis of your whole study, and the more thoroughly it is mastered the better the ultimate result.

This tape should be reviewed occasionally to check up on the student's sending to see that the characters are being made properly, and just as the machine makes them. One is liable to drift into an incorrect "swing" which is hard to eradicate when once formed.

After having learned to make all characters correctly, lay tape No. 1 aside for a while and take up No. 2.

TAPE NO. 2: This is the first tape that is intended to assist the student in beginning to read the characters as they are made by the Instructograph. The characters reproduced by this tape are as follows:

Lesson and Tape No. 2

First Side:

A A B B C C D D E E F F G G H H I I J J K K L L
M M N N O O P P Q Q R R S S T T U U V V W W
X X Y Y Z Z .. 11 22 33 44 55 66 77 88 99 00
.. ,, ?? .. Beginning again with the letter A the same characters are repeated over and over again in the same order to the end of the tape.

Second Side:

G P O C N Z J S Y L A H W E R X I V B Q U D T M F K . 7 2 9
1 5 0 4 8 3 6 . ? . , P U C X G A N R J W B L S F Y H V T Z M O
D Q K E I . 6 3 8 1 0 7 2 9 5 4 . , ? T K X E J Q Z D U L Y A W N
H V B J P C R O F M G S . 3 8 1 9 0 5 2 7 4 6 . ? . , Beginning again
with the letter G the same letters, figures and punctuations are repeated in the same order to the end of the tape.

The first side of this tape is similar to tape No. 1, except that it is some faster. Considerable space is left between the characters in order to allow the student time to write them down. It will be slow work to begin with, and plenty of space will be required.

It may be a good idea at first to run the tape through the Instructograph a time or so, watching the copy and listening to the sound of the characters as the machine makes them, without attempting to write them down. This kind of practice has a tendency to impress the sound of the characters on the mind.

Start the first side of tape No. 2 through the Instructograph quite slowly at first, just as slowly as it will make the characters plainly, and see how many of them you are able to read and write down. When you get one put it down on the paper, but if you do not get it instantly forget it, and "lay" for the next one. If you try to figure out a letter that you do not get instantly, or hesitate to think about it, the machine will make the next one when you are not prepared for it, and that also will be lost. Simply force yourself to read the characters instantly. If at first you only get an occasional one on the whole side of the tape, it is a start and you are doing all right. While quite simple, this tape is an important one and should receive careful attention. How one starts is an important one and is the basis of the whole study.

SENDING PRACTICE: Sending is also an important factor of telegraphy and must receive careful attention and diligent practice. How one starts to send is also very important, and much depends upon how the student begins to make the characters, spacing, etc.

Do not attempt to send words or phrases at this time. Practice making the letters, numerals and punctuations over and over again. Always use copy to send from. You may use the copy you have made from copying the second side of tape No. 2. If there is any question as to whether you are making the characters just as they should be, run tape No. 1 a few times to get the sound of the characters more firmly impressed upon the mind.

One great asset of a telegraph operator is good hand writing. It need not be "Spencerian," or particularly symmetric, but it should be plain, neat and easily legible. Even in this age of typewriters when a large percentage of telegraphic matter is written on the "Mill," an operator has much occasion to use the pen, pencil or stylus. Therefore, select a good clear legible style of writing and practice constantly to improve it. In practice always strive to make your copy neat and clean. Have it clearly legible, even if it is thrown away the next minute.

Lesson and Tape No. 3

TAPE NO. 3: This tape consists of small words, and is quite an advancement over No. 2. While the words are small, they are used constantly in writing and the student will find that being familiar with their sound on the instrument will materially assist in reading regular matter a little later. The matter of Tape No. 3 reads as follows:

First Side:

AM AN AS AT BE BY DO GO HE IF IN IS IT JO ME MY NO OF
ON OR OX SO TO YE .. AND ARE AIM AGE AID ANY BOX BOY
BEG BUY CAN CAR CAT COX DAY DAN DEN DIG EAT END
EGG EAR ELM FAD FAG FAN FAT FED GAG GAP GAS GET
HAD HAT HAY HEM HER ICE ILK INN INK ITS JOB JAM
JAR JIM KEN KEY KIP KIT LAD LAM LAW LAX LAG LAP
LAX MAD MAN MET MID NAB NAG NAP NOR NOW OAR OAK
ODD OFF OIL PAD PAN POP PAR PAT RAG RAM RAP RAT RAY
RED SAY SEE SET SIN SIX SKY TAB TAG TAN TAP TAR ULE
URN USE VAN VAT VIA WAG WAN WAR WAS WAX WED WHO
WHY WAY YAM YEA YES YEW..AM AN AS AT BE BY DO GO HE
IF IN IS IT JO ME MY NO OF ON OR OX SO TO YE .. AND ARE
AIM AGE AID ANY BOX BOY BEG BUY CAN CAR

Second Side:

SIX CAR USE AGE MY INN KIP TO WAN BOY HE SKY YEW
AS TAR DO MAN GAG IF VAN DIG IS SIN AID BE YAM INK
WAG AM NAG BUY ODD TAG BY ILK SAY AIM JO NOW VIA KIT
OX MET ARE SET CAN JAM TAN IT HAD LAW YE VAT DEN HEN
URN BOX YEA ATWAX CAT RAG ICE POP OF WHO OR ELM WAS
FAN DAY EGG MAD ULE GO BEG JIM FED KEN MID END

ACQUIRING THE CODE

It is a well recognized and indisputable fact that telegraphy may be learned only by acquiring the art of reading the code characters as sent by an operator on an instrument reproducing them the same, or very similar to, those that have to be read in actual telegraph work.

One may read books and study lessons until they die of old age, and not even begin to be an operator. One may practice with a key and buzzer or sounder for an indefinite period and never be a fair "ham." One may practice with another student and fare little better, as it is simply another case of "the blind leading the blind."

The only possible way to learn telegraphy is to have some one, or a machine directed by an operator (the perforated tapes) send to one, someone with a knowledge of the code, its fundamentals, its spacing and its technique. Slowly at first and very gradually faster and faster until one's ability to read the characters develops to the required degree to understand the fastest sending just as one understands his native language when it is spoken.

That is just what the Instructograph does. It will send to one as slowly or as rapidly as desired. It will work with one when one feels like work. It will teach the student for a few minutes or an entire twenty-four hours, as one elects. Therefore, with the Instructograph, tapes and these instructions one has all the equipment necessary to make him an expert operator. The rest is up to you.

PRACTICAL APPLICATION: Learning either the Continental or American Morse codes is exactly the same process, the only difference being that the codes differ somewhat in their make up. It would be similar indeed to learning either of two foreign languages. The process of learning would be identical, and one would simply learn to make use of the proper vocabulary.

Therefore, everything in this booklet up to the division of the lessons for the respective codes is equally applicable to either, and should be made use of accordingly. That is, the student of either code should diligently study everything contained herein up to the chapter captioned "Continental Morse Code Instructions," on page 20, and if that code is to be taken up, continue without interruption. But, if the American Morse Code is to be studied, the Continental Morse Code Instructions should be omitted, and the student begin with the chapter captioned "American Morse Code Instructions," page 34 and continue to the end.

This provides clear and concise instruction in both codes, which the student will find greatly to his advantage to know.

Acquiring the art of transmitting and reading telegraphic characters by sound as analyzed by many successful teachers is divided as follows:

Natural Ability   5 Per Cent.
Psychology   10 Per Cent.
Study and   Practice, 85 Per Cent.

If one possesses a natural ability to learn easily, it is, of course, some advantage, but if not, it is no material handicap. It is not the rule that the one who learns most easily, necessarily learns the best. It is sometimes like the case of money, "easy come—easy go."

The author of this pamphlet is of the opinion that the psychological attitude of the student is slightly underrated in the above analysis, and in many cases might absorb the five per cent attributed to natural ability. In any event, the psychological element in acquiring the code is unmistakably pronounced, and the mental attitude of the student is a vital factor in the work. This factor will be given further consideration later.
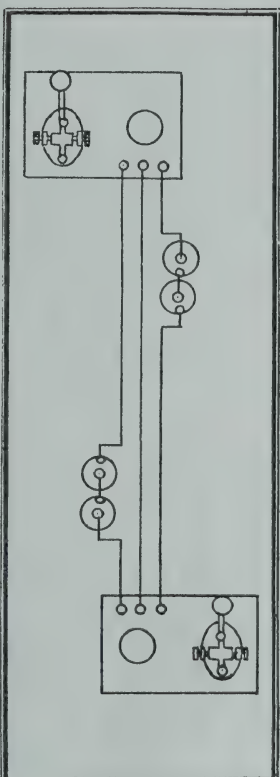
As before stated, learning the code is very similar indeed to learning another language, except that the hand is trained to speak the language by re-

do any experimenting with it so as not to cause a short, thereby blowing out fuses or possibly injuring yourself. While it may do no particular damage to stop the phonograph motor by use of the speed regulator, and this will often be found convenient, it is recommended that when the work is finished for the time being, and the machine is to be idle for some hours, the motor be allowed to run down, rather than leave it stopped by the regulator. The motor wound up and throttled down by the regulator leaves some strain on the motor which may as well be avoided.

Handle this machine as you would any other delicate piece of machinery and it will serve you well, and last an ordinary life time. There is nothing to get out of order, and seldom indeed is it necessary to replace any part.

HAY RAY ITS ME DAN TAB FAG NOR IN EAT KEY OAR YES SO . ANY OIL RED EAR FAT RAT ON WED . LAP NO GET FAT WAR LAM COX AN FAD SEE TAP LAD JOB HER WHY HEM AND GAS LAX OFF PAN GAP LAG HAT JAR NAB OAK NAP PAD RAP WAG PAR . . RAM SIX CAR USE AGE MY INN KIP TO WAN BOY HE SKY YEW AS TAR DO MAN GAG IF VAN DIG IS SIN AID BE YAM INK WAG AM NAG BUY ODD TAG BY ILK

It may be a little difficult in getting started to copying these words as you would like, and if any serious difficulty is experienced, with the machine running very slow, it indicates that you have not had sufficient practice on the sound reading. In this case run the tape through and follow the copy with the eye, without attempting to copy it at this time. Pay strict attention to the sounds as you follow the reading of the characters, as made by the In-structograph. If necessary run the tape a number of times in this way.

Next prepare to copy the matter, with the machine running very slow. The same rule will apply here, that is, if you do not get a word, or letter of a word, pass it up and look out for the next one. Do not attempt to figure it out. One never has time for that in telegraphy. If you don't get it, it is lost. If you only get an occasional one to begin with, it will soon begin to come to you, and you will be able to copy it without trouble.

You should continue to copy the words on Tape No. 3 until you are able to copy the matter on either side correctly with the tape moving at a fair rate of speed. Or, with the tape passing through the machine in about eight minutes. When that point is reached, tape No. 4 may be taken up.

SENDING PRACTICE: Do not overlook the instructions under "Sending" on page 16, when practicing, and remember that it is quite necessary to maintain a correct position at the table, hold the key easily and do the practicing just as though you were engaged in actual work. Also remember that you should send so that it is easily read, or it is no use sending it. It would be better to attempt no speed, but continue to make the characters

Showing Hook-up of Two Signal Practice Sets

The words copied from tape No. 3 may be used to practice sending, and very clear and evenly spaced. That is the important factor. Speed will come

in good time, as you continue to practice. You should put in at least one third as much time practicing sending as you do on the receiving part of the work.

Lesson and Tape No. 4

Upon completing this lesson and tape No. 4 you will have prepared yourself to begin receiving routine material, such as is commonly copied by the telegraph operator in regular work.

TAPE NO. 4: This tape consists of words larger than those contained in Tape No.3. Indeed, some of the words are quite difficult, and have been selected as affording splendid practice in receiving. The second side contains abbreviations commonly used in wire work. They are not interpreted as it would serve no good purpose to do so, as they vary with the practices of operators of various lines. They may be figured out in the main, and afford very good practice. They are, in a sense, code combinations. The matter of the tape reads as follows:

First Side:

(iii Period Tape No. 4 Words Period)

THOSE NAME HOME ONION HAND INDIA IODINE INTO
INTEND EAST EDEN EDITION EATEN TENTH TENT
TOOTH ESTATE ESTIMATE OATS SAID SOON SOME
MITTEN MADDEN OMIT ONTO OASIS OMISSION SHED
SATAN INTONE TIME TESTED TENNANT MADAM MAD MEND
TIME MOTION MISSION ADMIT SEASON DITTO DINNER
NOTION HEAT UNITE UNION NOTATION HINT GAIT GAUGE
VANISH VAUNT VEND BABOON SAND DANISH DOMINATE
MAINTAIN DATED DETEST DISH DEMAND DISSENT AMID
NONE NOTE HOTTEST HAM HIDDEN WASTE WEIGHT
AMASS NEAT NOTED GOAT BOMBAST NOD NOSE WHIST
WHITE WAGON BEE BUNTING CACTUS CAMBRIC CATCH
CLOCK COCOA COMMERCE YACHT YELL YARD YESTERDAY
YEAST YOUNG YOKE PALPITATE PAPER POPPY PREPARE
PLEASANT PLEAD QUACK QUALITY QUESTION QUICK
QUILT QUIZ FORGE FRAY FULLY FUSE FUNNY LEGAL
LOYAL LULL LUNAR PERIOD

Second Side:

(iii Period Tape No. 4 Abbreviations Period Period)

ABT ACCT ADS AGT ANS AY R AUG AVE B BK BAGE BATY
B4 BETWN BLK BLNX BOT BLDG BIZ BI CN CASHR CKT CLR
COLL C O D COMSN CO CONDR C & E O K CLD XNG
DA D H DEC DELY DISPR DD DIF DINR DIST DBT DOZ
DUP ELECTN ENGR EXCN EXA FEB R FWD FRT 4 MAN
GBA GPA GSA GD GM GOVT GTD HF HR IMMY
INC INV JAN NU LRN LITE LO LTD MD MN MK
MGR MFLD MFST MFR MNY MAR MKT MTR MA MSG

OPERATION OF INSTRUCTOGRAPH

The "Instructograph" as its name implies, is an instructor in every sense of the word. It will render service that cannot be duplicated by any other instructor.

Before attempting to operate the Instructograph, carefully study Figure 1, on page 4, and see that the TAPE ALWAYS RUNS IN THE DIRECTION AND EXACTLY AS INDICATED BY THE ILLUSTRATION. If it is not so run the machine will produce the characters backward and wind the tape incorrectly.

INSERTING TAPE: Place the full spool of tape on post No. 7 and the empty spool on Post No. 8. Pass the tape around Post No. 2, between the spring and the post, bringing it around to the empty spool, and insert the end of the tape in the slot to prevent it from slipping, just as illustrated. Before proceeding further, STOP and check your work to see that the top panel of your machine looks exactly like the illustration.

REVERSING TAPES: When the tape is all run onto the spool on post No. 8, exchange positions of the spools, placing the empty spool on post No. 8, and the full spool on post No. 7. In exchanging the spools, the spool containing the tape must be TURNED OVER in order to produce the characters on the other margin of the tape. Again check the running of the tape to see that it is exactly like that shown in Figure No. 1.

GENERAL: When an oscillator is built into the Instructograph or if a telegraph key and sounder is connected as in Figure 2 you have two keys in the circuit; one on the Instructograph (posts 1, 2 and 3), the other your hand key. It is therefore necessary that the hand key circuit be left open when the Instructograph is sending characters, or the Instructograph key be left open while practicing with the hand key. The gap between the contacts on the hand key will break the circuit while the Instructograph is being used providing the shorting lever on the key is left open. The tape at post No. 2 on the Instructograph will provide the gap necessary at the contacts on post No. 3 while you practice with the hand key, however, if the tape is not threaded around post No. 2 it will be necessary to place a piece of paper between the post and the lug on the spring to provide the necessary gap.

Always be certain that the oscillator switch is at the off position when you finish your practice period. Leaving the oscillator on for a long period of time while the machine is not in use may burn it out or otherwise damage the Instructograph. Where a battery is used a continuous drain will cause it to heat and thus dissipate its energy in a few hours.

No switch is provided where a key and sounder practice set is being used and one or more wires between the practice set and the Instructograph should be disconnected at binding posts (4, 5 and 6) when the outfit is not in use. Even though the contacts are separated enough so that the sounding bar is not engaged some dissipation of the battery energy is likely because of the closeness of the contact points to each other.

The A. C. Instructograph should be handled like any electrical device, being sure to disconnect the plug from source of supply before trying to

CONNECTIONS: Figure No. 1 shows the top panel of an Instructograph which has an A.C. oscillator built into the machine, for study of the Continental (wireless code). The various parts are numbered 1 to 10 inclusive and the proper connections of the telegraph key and headphones is shown.

When a battery operated oscillator is requested and is furnished by us this is installed inside the case. Only three binding posts (4, 5 and 6) are used as in Figure No. 2. The No. 5 post is a common post and is made for two connections. The telegraph key should be connected to posts 4 and 5 and the headphones to posts 5 and 6. To operate the audio oscillator 4½ volts of battery supply is required and the battery should be connected to the two loose leads from the oscillator. Be sure to connect the red wire to the positive terminal of battery and the black lead to the negative terminal. Either a 4½ volt "C" battery or three No. 6 dry cells connected in series may be used. After making the connections the battery may be stored inside the case.

Figure No. 2 shows the top panel of an Instructograph (without oscillator). This model is furnished for study of the Continental code, where student is furnishing his own oscillator. Also for study of the American Morse (wire code) where a telegraph key and sounder are to be attached.

When a student furnishes his own oscillator the Instructograph becomes a mechanical key and should be connected to the oscillator exactly the same way as a hand key is connected using posts 4 and 5 on the Instructograph.

The connections between a three post telegraph key and sounder practice set is illustrated and wires must be connected exactly as shown. If you wish to use a key separate from the sounder, the key should be connected to posts 4 and 5 and the sounder to posts 5 and 6. A key and sounder practice set with only two posts may also be used by connecting leads to posts 5 and 6 but the key lever on the practice set must be kept closed while the Instructograph is in use to complete the circuit. In every case three to 4½ volts of battery supply is required to operate the sounder and the battery should be connected to the two leads coming down from the panel inside the Instructograph case. One of these wires attached to the positive and the other to the negative terminals of the battery. Which wire to the two terminals makes no difference. You may either use a "C" battery of 3 to 4½ volts or you can connect up two No. 6 dry cells in series to make up the proper voltage. After making the connections store the battery inside the case.

MSGR	MI	MIN	MRS	MOS	MCH	NR	N	NTG	NVR NU
NOV	NO	OCT	O K	OT	OPN	OTR	R	PKG PD	PA PLS
LB	PFD	PREST	QK	RY	RDY	RECD	REFR	REFT	SD
SM	SA	C	CN	SLO	SDG	SIG	STA	SMTG SPL	SEPT
SUPT	SW	SYS	TF	TT	T	TN	TS	THO	TODA TRK
TPA	VY	WTR	W B	WN	WR	WO	YD	UR	PERIOD
PERIOD	ABT	ACCT	ADS	AGT	ANS	AY	R	AUG	AVE
B BK	BAGE	BATY	B4	BETWN	BLK	BLNK	BOT	BLDG	
BIZ BI	CN	CASHR	CKT	CLR	COLL	COD	COMSN	CO	
CONDR	C&E	OK	CLD	XNG	DA	D H	DEC	DELY	DISPR
DD	DIF	DINR	DIST	DBT	DOZ	DUP	ELECTN	ENGR	
EXCN	EXA	FEB R	FWD	FRT	4MAN	GBA	GPA	PERIOD	

The more thoroughly you master this lesson and tape, the less trouble you will experience with the matter of subsequent tapes. The tapes hereafter etc. Therefore, it is important that this tape be given careful attention and considerable practice.

Do not attempt to run this tape at all fast until you have used it for a considerable time. The words and abbreviations have been selected with a view to bringing into frequent use the letters of the alphabet which are but seldom used in actual work. It is just as necessary for the operator to be able to distinguish the letter "Q" as it is the letter "E" although the latter is used continually and the former but occasionally. When you are able to copy the words and abbreviations with the tape passing through the Instructograph at a fair rate of speed, say at the rate of 12 to 15 words per minute, you will be ready for the next lesson and tape.

SENDING PRACTICE: Sending practice should be kept up by all means and very careful attention given to the spacing, as that is an important factor of transmission. The words and abbreviations copied from tape No. 4 will be found to be excellent practice in sending. The abbreviations are always sent slower, and must be perfectly clear and distinct. They cannot be guessed at. Other matter may be used for practice, but the speed should be kept down to the rate you are able to receive, for the time being at least.

ERRORS IN TRANSMISSION: At this stage of the work it is necessary to bring up the question of making errors when sending. Naturally errors are made in sending—a word may be omitted, misspelled, a line skipped in reading the copy, or numerous other causes for sending or starting to send a word incorrectly. Such errors must, of course, be corrected by the sender in order that the operator receiving the matter may get his copy written just as it should be.

When an error is made in sending it is the usual practice to correct it in the following manner: Immediately upon discovering the error, the sender would make an interrogation (——.——.), which is the recognized error signal in this code, and repeat the last word sent correctly and proceed with the message. The receiving operator upon hearing the error signal would immediately discontinue copying and watch for the correction. And, unless copying too close to the sender he would not have written or started the erroneous word.

Beginning with tape No. 5, and in subsequent tapes, these errors may be made just as they will appear in actual work, and the student must look out
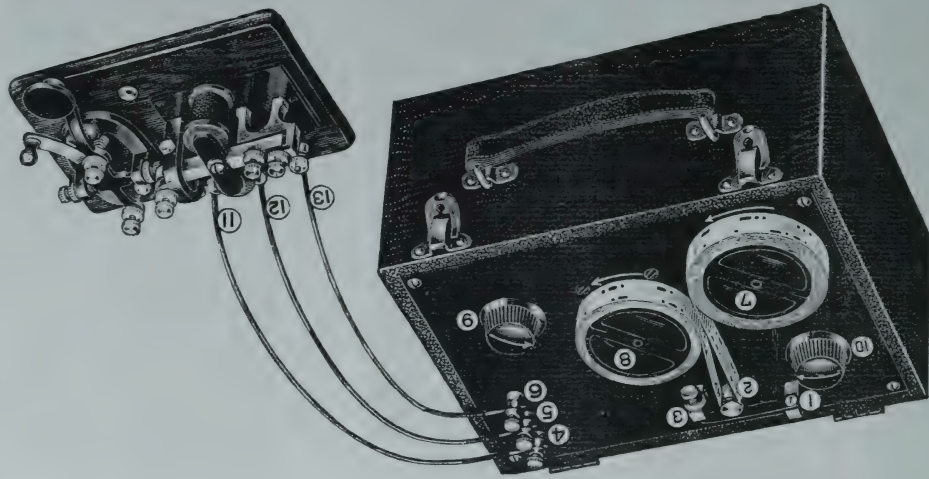
FIGURE 2. Diagram shows proper hookup of a three post key and sounder combination for study of American Morse (wire code). Other hookups for either code are fully covered on page 8. When setting machine up for the first time be sure to check data on page 9 relative to proper threading of tapes before attempting to run the machine.

for them, and see that his copy is not mutilated or written over. There is no time for correcting copy while receiving a message, and it must be written down just as it is intended to be delivered to the party to whom it is addressed.

Lesson and Tape No. 5

The student has now reached the stage of the work where he will copy the exact material that he will be required to copy when employed as an operator. It is now a case of practice with a view to developing speed in both receiving and sending. The "irksome" part is over, and the practice should be very interesting from now to the end of the training.

TAPE NO. 5: This tape contains typical railroad messages, just as they are sent by railroad employes for the convenience of the company. They will afford considerable splendid practice. The messages are transcribed in full below:

To begin work with this tape it should, of course, be started quite slow, and gradually speeded up until the student is able to copy it at the rate of 20 words per minute (five letters to the word). It will require considerable time to complete this tape, but it should be remembered that you are copying regular matter now, and well advanced in the art of telegraphy.

After a while these messages will become more or less familiar and more easy to copy. Work with the tape regardless of that fact, as it is just as good practice, when the matter is a little familiar as it is otherwise. It is all the time training the mind to associate the sound of the letters with the letters themselves.

First Side:

(i i i period) Railroad messages (hr ds fm) Chicago 29 (To)
Condr No 227 Fn (Period)
Pick up car flour at Duval and car hay at Hamilton
                                (Sig) K C K (Period)

(hr ds fm) Chicago 29 (To)
Agent Fn (Period)
In filling out train No. 233 give coal preference over other dead freight
                                (Sig) K C K (Period)

(hr 2 copies ds fm) Chicago 29 (To)
C & E No 210 Fn (Period)
Look out for cam ? (Error) cattle on right of way between mile
post 196 and 198
                                (Sig) K C K (Period)

(hr ds fm) Chicago 29 (To)
W C Brand   Care of Condr No. 237 Fn   (Period)
Get important mail at Fallon and report promt ? (Error) promptly
on matter referred to
                                (Sig) D E Babcock (Period)

(hr ds fm) Chicago 29 (To)
Condr No 246 Fn (Period)
F & G car No 32716 at Gasco has drawbar out chain up and bring
to Chicago
                                (Sig) K C K (Period)

tape opens and closes the contact points firmly at Post No. 3 uniformly. The spring is always properly adjusted and the set-screw set tightly when the machine is shipped, and usually requires little attention for some time, unless bent or jarred out of adjustment. For best results the lug on spring should be very slightly to the left of center on Post No. 2.

The most common cause of trouble in spring adjustment is caused by accidentally bending the spring when wiping off the panel of the machine with a cloth, or some similar mishap. If the spring should be bent out of shape in this manner, simply take off the spring, as heretofore directed, straighten it out with the fingers and replace it. Adjustment may then be made. Careful study of the spring connections will enable one to make all adjustments quickly and easily.

MOTORS: The Instructograph is equipped with either a 110 volt-60 cycle electric motor or a high grade phonograph spring motor. With ordinary care they should last for years.

Occasionally a spring motor—until used enough to smooth the bearings—may not always start, even when the speed regulator is set for normal speed. Should this occur simply turn the spool on Post No. 8 to the left slightly with the fingers.

Then too, the felt pad controlling the governor speed of the spring motors may become dry in time and should be oiled with a heavy grade of oil to keep it running smoothly.

To the shaft at part No. 8 is attached the mechanism which engages the spool and pulls the tape from the spool on Post No. 7 around Post No. 2. This mechanism is fastened to the shaft by a set-screw. Once in a great while this set-screw may work loose and allow the shaft to turn inside of the mechanism. If this should occur, the set-screw may be refastened with a screw driver by removing the four screws at the corners of the instrument panel, and loosening the three motor screws just enough to enable one to pass the screw driver to the screw head.

SPEED REGULATOR: The A.C. Instructograph uses either a high re-sistance rheostat or a cone arrangement to control the motor speed depending on the type of motor used. The control knob is located on the front right hand corner of the panel, figure 9, except that on the 4 binding post models (4-5-5-6) which use the rheostat the control is at figure 10 on the back left hand corner.

The spring-wound Instructograph is equipped with a speed regulator, and the pointer swings from a shaft illustrated as Part No. 9, Figure 1, Page 4. The pointer, of course, would be turned toward "S" (Slow) for slow or stop, and turned toward "F" (Fast) to start or increase speed. The numbers or marks on the dial do not indicate any particular speed of sending, but may be used for that purpose.

Due to variation in spacing of characters on different tapes the Instructo-graph cannot be calibrated. To arrive at the number of words per minute the Instructograph is sending set the machine at the speed desired and let it run for one minute. Then by counting the number of characters sent, allowing five letters to a word, you can determine the number of words per minute.

(Hr g| fm)   Gilroy   29   (To)
Chief Spl Agent Fn   (Period)
P & O y ? (error) car 2769 car load of merchandise on house track broken into last night and contents pilfered (Period) Apparently considerable stuff taken but just what is missing cannot be determined until a check of consignees invoices is made Detailed report by mail
(Sig)   A D M (Period)

(Hr Ds Fm)   Chicago   29   (To)
Baggage Agent   Fn   (Period)
Forward baggage bearing check 9673 to Chicago immediately
(Sig)   An ? (Error) A N Campbell
(Period) N M

Note: The letters inclosed in brackets are not copied by the receiving operator. They are the usual preamble to sending a message, etc. "Hr." is commonly used to indicate "Here" or "Another Message;" "Ds" is the office call of the office sending the message, and "Fm" means From the place sent, and "Sig," of course, means the signature. A period is usually made between each message.

Second Side: (i i i Period) Railroad Messages (Period) (Hr All copy Ds Fm)

Chicago 29 (To)
Am ? (Error) All Agents (Period)
Brown leather suit case marked B F M on one end and presumed to bear check No 22794 for Manning has gone astray (Period) Search your baggage and freight rooms f ? (Error) and report promptly if found
(Sig)   J D Grant (Period)

(Hr Ds Fm)   Chicago   29   (To)
D J Clary opr   Fn   (Period)
When relieved at Ferrin report to Agent Wheeling immediately
(Period)   Pass on No 233
(Sig)   K C K   (Period)

(L ? "Error" Hr Ds Fm)   Chicago   29   (To)
Agent Fn   (Period)
Your report of passenger earnings for week ending 14th not yet received (Period) Please forward promptly
(Sig)   L D B   (Period)

(Hr Fn Fm)   Ferrin   29   (To)
K C K Chicago   (Period)
Shipper wishes to begin loading the 15 cars of cattle at 4 30 A M the 23rd (Period) Please have engine and crew on hand
(Sig)   M H W   (Period)

(Hr Ds Fm)   Chicago 29   (To)
Agent   Fn   (Period)
This message stamped and countersigned by you will be authority for Conductor No 226 to pass D J Clary Ferrin to Wheeling
(Sig)   L D Baker   (Period)

(Hr Ds Fm) Chicago 29 (To)
Section 4 Man Fn (Period)
Cattle reported on right of way between mile post 196 and 198
(Sig) A D J (Period)

(Hr Ds Fm) Chicago 29 (To)
Condr No. 233 Fn (Period)
No water at Grenada (Sig) K C K (Period)

B sure 92 last 1 (means be sure and deliver last message)

Lesson and Tape No. 6

In view of the fact that many students learning the American Morse Code have in mind being employed by a railroad company, the matter on tapes 6 to 10 inclusive contains material largely used in railroad work, such as commercial messages, train orders, etc. If one has some other field in mind, this material will answer every purpose just as well as other matter, as it is simply a case of learning to read the characters from the telegraph instrument, and one class of matter is as good as another. The train orders particularly afford splendid practice, as they contain not only words and figures, but the names of towns and cities as well.

Tape No. 6: Tape No. 6 consists of typical Commercial telegrams, such as are sent by the Postal or Western Union offices, whether such offices are exclusive commercial offices or operated by the railroad company at their local stations.

All commercial companies do not use the same message form, but generally speaking there are four parts to any commercial message as follows:

1. The preamble (the business of the message).
2. The address (to whom and where sent)
3. The text (the message to be conveyed)
4. The signature (the name of the person sending it)

Punctuations in messages are usually omitted, and when they are sent, upon specific request of the sender, they are charged for as words.

Only the complete matter of the first five tapes is reproduced in the lesson material. From now on the student can easily get the characters from the tapes as they are sent by the machine, and it is considered better teaching logic to give only a sample of the matter. Just enough to give a comprehensive idea of what the tape contains. Therefore, if you desire copy to check your receiving by, make a copy of all the messages and compare them with the next copy you make.

The first message on the first side of tape No. 6 reads as follows:

(i i i Period) Commercial messages (Period)
(Hr No 21) (Cn) (Ck) 9 (Fm) Ca Charleston W Va

9 55 A 9 (To)
Clay D. Danner,
Hampton Ind (Period)
Have position open at one fifty wire immediate acceptance
(Period) (Sig) Clayton & Brown (Period)

While it is not the intention to give any particular information as to the form of messages, as it varies with every company, and would be of no material benefit, a little explanation of the message just quoted may be helpful. Usually

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THE INSTRUCTOGRAPH

ITS CONSTRUCTION, CARE AND OPERATION

It is the intention to make the instructions regarding the care and operation of the Instructograph so plain and complete that one with no knowledge whatever of telegraph instruments, electrical devices or mechanical operation, will be able to adjust and operate the machine, as well as make minor repairs, if necessary, without any trouble.

CONTACT BREAKER: Parts numbered, 1, 2 and 3 constitute this unit, which operates as follows: Post No. 1 supports a spring which has an iron lug near the center and a silver contact point near the end. The lug rests in the shallow groove of Post No. 2, with the contact point resting against another contact point in an adjustable set-screw at Post No. 3. This contact is what serves as a key and transmits the characters which are perforated in the tape.

The contact points meeting at Post 3, as just described, closes the circuit, and if connected with an oscillator, as illustrated in Figure 1 a constant "buzz", or note will be heard. The paper tape, however, which passes around Post No. 2, as illustrated, raises the lug of the spring sufficient to separate the contact points at Post No. 3. Therefore, when the unperforated part of the tape is between the lug of the spring and Post No. 2, the contact points at Post No. 3 will be separated about one-thirty-second (1/32) of an inch, and no sound would be heard, as the circuit would be open.

From this it is easily observed that the contact points at Post No. 3 operates as the key when the spring lug drops into the perforations of the tape, making the contact points open and close as directed by the dots and dashes perforated in the tape.

The contact points at Post No. 3 occasionally collect small particles of dust between them, which interferes with the usual firm contact. A small piece of soft paper drawn between the points, with a slight pressure on the back of the spring at Post No. 3 will remove all dust and dirt. If the machine is not used for a time, the contact points may have a tendency to corrode, particularly in damp climates. A small piece of fine sand paper or an ordinary nail file drawn between the points will remedy the trouble, should it occur.

ADJUSTMENT: The proper adjustment of the spring and contact points is the most essential factor of the perfect operation of the Instructograph. This adjustment is very simple and easily made when the mechanism is clearly understood and this is quickly accomplished by a careful study of the illustrations and instructions.

The spring should not be too stiff, nor yet too loose. Just the proper tension will have to be determined by experimenting with it. The lug should rest firmly in the slot of Post No. 2, but not so tight that it will cause a "grating" noise, unnecessarily wear the tapes and not produce the best results. The spring may be adjusted by loosening the screw at Post No. 1, taking the spring out and slightly bending it with the fingers; or Post No. 1 may be turned slightly to the left or right with a small wrench or pair of pliers. It is best to try the spring at Post No. 2 with the finger to see that it is firm but not pressing too hard. Just firm enough so that the lug dropping into the perforations of the
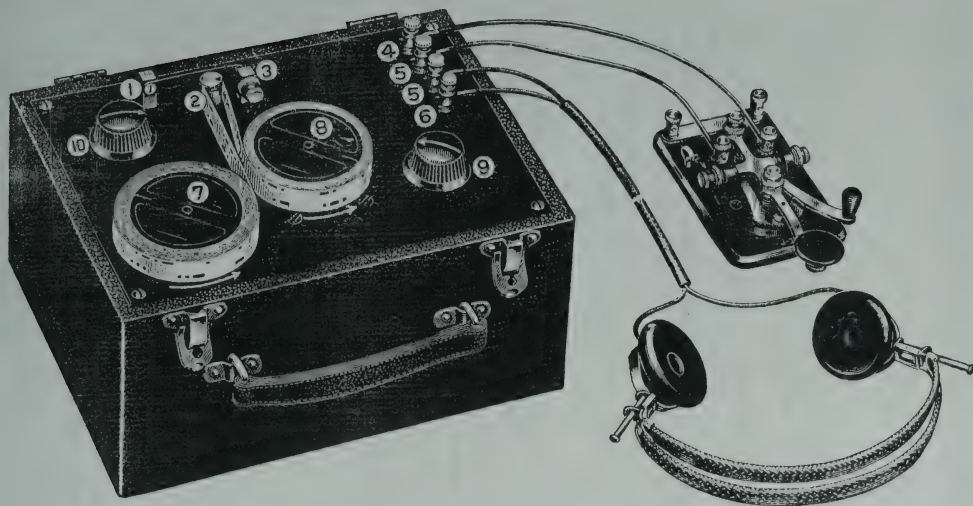
FIGURE 1. Diagram shows proper hookup of headphones and telegraph key for the study of the Continental (wireless) code where an oscillator has been installed inside the case. See page 8.

Be careful to see that the tape always runs exactly as illustrated above, otherwise it will produce the characters backwards and wind the tape incorrectly. See page 9 for details.

the letters, etc., inclosed in brackets are not copied by the receiving operator. They are sent to indicate certain things to the receiving operator and would mean nothing to the party receiving the message.

It is quite a common practice to make a period or so before starting transmission. The first line, however, is simply a key to what is on the tapes and has no connection with the messages proper. "Hr" (meaning here or another) is usually sent before each message to indicate that a message is going to be sent and for the receiving operator to prepare for it. The No. 21 is the number for each day. In this instance the operator made an error and sent "jacm" in error—made an interrogation, and then sent the correct word or symbol "Ck" meaning the check, or number of words in the message. The 9 indicating that the message contains nine words in the body of the telegram. The "Fm" means the place from where the message was sent, and Charleston, W. Va., the name of the place from which sent. It is customary to give the office call for the local office in Charleston if the message is sent from an office in the city other than the main office. The "Ca" is the call for the office call for the main office, if the message is sent from an office in the city other than the main office. The 9 55 A M means the time the message was filed and the "g" means the date of the message. The "To" of course, means, to whom addressed.

The message as copied by the receiving operator would probably read about as follows:

No. 21 Ck 9 Ca Charleston, W. Va. 9:55 A M Nov. 9
Clay D. Danner,
Hampton, Ind.
Have position open at one fifty wire immediate acceptance.

Clayton & Brown

These messages should be copied indefinitely. Even after they are quite familiar they will afford splendid practice. The next tape should not be taken up until you are able to copy these messages at the rate of at least 20 words per minute and make clearly legible copy of every message.

SENDING PRACTICE: Using the copy made from tape No. 6, the sending should be practiced for a considerable period. Make other messages and send them, keeping in mind that they must be read by one unfamiliar with their contents. Make all symbols clear and distinct. At this time in addition to practice on the message material, the student should practice sending newspaper and magazine articles, always paying particular attention to the spacing and try to maintain an even speed all the time. That is, adopt a certain speed that is best suited to your ability and keep it constant.

It is good practice to run a tape through the machine and listen to the sending without copying it. Just listen to the "rythm" as the machine sends just as you would if you were a perfect sender. The machine's spacing is correct in every particular, and listening to it should assist one in making the characters similar.

Lesson and Tape No. 7

TAPE No. 7: This tape contains typical train orders and should afford splendid practice for the student, as it includes both letters and numerals, and is of such material that it will not easily become familiar.

The first train order on the first side of tape No. 7 follows:

(iii Tape No. 7 Train Orders Period)

To Fd No. 220
To Cn No. 219
19 West Order No. 18

CONTENTS

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46   INSTRUCTOGRAPH COMPANY

To Bu Opr (Period)

No 219 eng 729 meet No 220 eng 718 at Buford

(Sig) T J W

The entire tape is made up of various orders, just as they would be sent by the train dispatcher to the operators on the line. A little explanation regarding train orders may be helpful in copying them.

A train order is sent to all operators concerned at one time so far as possible. The dispatcher would call each operator and say (in this instance) 19 West, meaning that he was going to send a "19" form of train order, and that it was intended for a Westbound train. He would tell each operator what kind of order was to be sent, and the direction of the train to be copied for. He would then start with the order number, and then send to each operator the number of the train that was to receive the order at his office. In this case it is also sent to the operator at the meeting station, as an extra precaution. He would then make a period, and proceed with the body of the order. All operators addressed would copy the order at the same time, and all should have it exactly as sent. Unless otherwise directed each operator copying the order would repeat it to the dispatcher in the order they were addressed, all other operators interested checking their copy to see that it is repeated as he has it.

Practice with this tape should be continued indefinitely, as it will afford a lot of good practice, and may be copied to good advantage ever after it becomes more or less familiar. When the student is able to copy the orders at a fair rate of speed, tape No. 8 may be taken up.

SENDING PRACTICE: It will be found to be splendid sending practice to send the train orders copied from tape No. 7, just as the dispatcher would send them, remembering that several operators are copying them, and that they must be sent absolutely correct. Pay particular attention to the spacing and regularity of the speed. The speed may be increased some, if it can be done without detriment to the class of matter being sent. Correctness in sending is far more important than speed, for one will have plenty of time to gain speed even after this training is completed.

All kinds of matter may be used in sending practice at this time.

Lesson and Tape No. 8

TAPE No. 8: This tape also consists of train orders, a little more advanced than those on tape No. 7, but are more or less similar in general make up. They are, of course, different as to trains, meeting points, etc., and will afford considerable practice that will have a tendency to advance the student in his receiving.

The first train order on the first side of tape No. 8 reads as follows:

(i i i Period) Train Orders (Period) 31

Order No. 80

To Do No 20

To W Opr

To G No 21 (Period)

No 20 eng 265 meet No 21 eng 308 at Woodstock

(Sig) J E C (Period)

The entire tape contains similar train orders, but they are more intricate as they advance, and longer. They will be found to be excellent practice.

SENDING PRACTICE: As with the last tape, No. 7, the material copied from tape No. 8 will make splendid sending practice, and the train orders should

UNPACKING INSTRUCTOGRAPH

★

THE standard "Instructograph" consists of the machine proper and ten rolls of double perforated tapes.

Each machine is carefully wrapped and packed to prevent damage in transit and should reach its destination in perfect condition, regardless of how or where shipped. Should the machine be damaged in any respect, upon receipt, such damage should be called to the attention of the transportation company immediately with a view to filing a claim.

The extra spool and book of instructions will be found in the top of the case, on the instrument panel, carefully wrapped and protected. The ten tapes and winding crank will be found inside of the case proper, on some models, carefully packed in paper. The tapes and other material should be removed through the small panel in the back of the case, and not by taking out the instrument panel. Every particle of packing should be carefully removed so that nothing interferes with the free operation of the motor.

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be sent repeatedly. Other matter, such as newspaper and magazine articles may be used to good advantage. Never lessen your endeavor to make your sending clear and even, rather than fast. Speed will come with practice.

Lesson and Tape No. 9

TAPE No. 9: This tape also consists of train orders, the first side being what is called a "Schedule" train order. That is, it is a telegraphic schedule over the entire division, and takes up the whole of the first side of the tape. This tape will afford splendid practice as it contains not only words and figures, but the names of many towns as well.

Only a start of the order is given below, but enough to show how it would be copied in actual work. The beginning of the first side reads as follows:

(i i i Period) Tape No 9 Schedule train order (Period)
31 West Order No. 79

To Cn Eng 783 (Period)
Eng 783 run stock extra leaving Cheyenne on Thursday Nov 9th as follows with right over all trains Leave

Cheyenne	3 50 A M
Borie	4 15 A M
Grants Canyon	4 37 A M
Ozone	4 46 A M
Buford	4 57 A M
Sherman	5 07 A M

This order continues to the end of the first side of the tape, and the other side is also standard train orders and messages.

COPYING BEHIND: All efficient operators learn to copy behind the sender. That is, they would probably not write down the first word sent until the operator sending the matter had sent one or two additional words. The number of words one is able to copy behind varies with the class of matter being copied and the ability of the operator, of course, but a couple of words will be quite enough in ordinary work.

The advantage one gains in copying behind is that one learns to have the full text of the matter being sent in mind instead of just one word. One is able to gain greater speed and is less liable to make an error. Again, should the sending operator make an error and correct himself by making the error symbol and repeating a few words, if copying too close the receiving operator would have the erroneous word written or at least begun, and would have to erase or make another copy.

A very good way to acquire the habit of copying behind is to begin the practice with words or messages which are more or less familiar, and one has some idea of what is coming. It is recommended that tapes 3, 4, 5 and 6 be used for this purpose. After learning to copy behind with this familiar matter, try it on messages with which you are not familiar. Only continued practice will produce the desired result.

The simpler and easier the matter the greater number of words one is able to copy behind. One word, or 3 or 4 letters is considered very fair in difficult code combinations.

We have purposely deferred bringing up copying behind until you have had quite a little of the training, because the student has had enough to contend with learning the code without taking up the more advanced part of the work.

FOREWORD

THIS little volume has been prepared with two distinct purposes in view. First, to convey an intimate knowledge of the care and operation of the Instructograph. And, second, to assist the beginner in the telegraph field to a quick but thorough knowledge of the wireless and wire codes.

The information pertaining to the care and operation of the Instructograph has been compiled after several years of experience in manufacturing, selling and operating this machine. The information pertaining to the art of acquiring the codes is the result of many years of experience as an operator, both International Morse and American Morse, and from teaching the codes in residence schools, and by the extension method, with the use of the automatic machine.

The material has been checked by experts in the art of teaching the codes, and it is the common expression of experienced operators that "if one cannot learn to become a skilled operator with the consistent use of your machine and instruction, they had as well give up the idea." Therefore, this little volume is presented to the public with every confidence that it represents the very best obtainable.
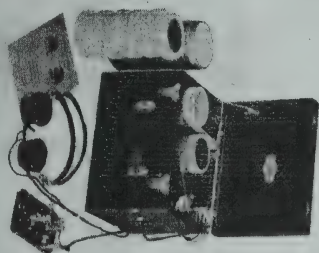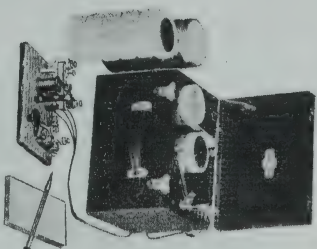
O. B. KIRKPATRICK.

SENDING PRACTICE: The schedule train order, as well as the other orders copied from tape No. 9 will make splendid sending practice. If you will try to remember how difficult it was for you to copy this schedule order, you will more readily appreciate the necessity of clear and correct sending. Therefore, watch that part of the practice as much as you have in the past.

There is little that may be added in connection with sending. Continued practice, trying to imitate the machine's sending will make you a good sender. It is, therefore, now up to you.

Lesson and Tape No. 10

We have now reached the last lesson and tape of the training, and it should prove the most interesting of them all. It consists of a newspaper article, and it includes capital letters, quotation marks, brackets, paragraphs and probably other symbols not encountered in ordinary work. Therefore, you will have to "brush up" a little on the symbols and be prepared for them in this article.

TAPE NO. 10: The first part of the article is given below:

(iii Period) Tape No. 10 (Period) Press Report by (CX) William (CX) Shinnick.

"It was inevitable, once the great valley and the plains between the (CX) Rocky Mountains and the (CX) Alleghenies were settled, that (CX) Chicago and (CX) New York would become what they are (DX) the largest and most important cities on the continent (Period)"

This article continues through both sides of the tape, and will afford almost endless practice for the student. When it can be copied legibly at the rate of 25 or 30 words per minute (5 letters to the word), the student may consider himself an operator.

If the necessity for additional practice is felt, all tapes from probably No. 5 on, may be reviewed with good result.

SENDING PRACTICE: While no licenses are issued in connection with the American Morse Code, except in connection with a radio operator's license, an applicant for a position is usually subjected to an examination as to his sending and receiving ability. The better one can send the more favorable an impression he will leave with his prospective employer. Therefore, even after you have concluded this training do not relax your endeavor to become a better and faster sender.

Telegraphy

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FOR WIRELESS

FOR WIRE

CONTINENTAL MORSE

AMERICAN MORSE

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Telegraphy

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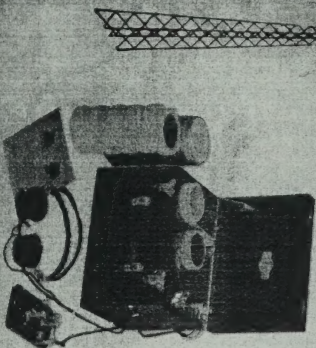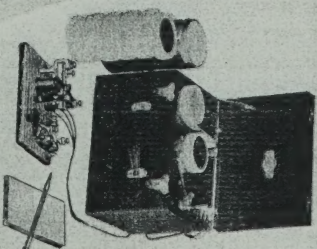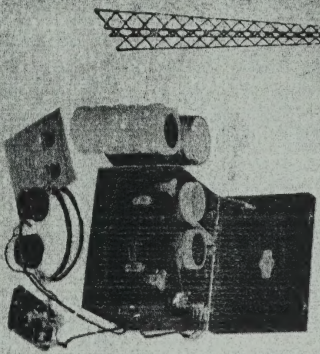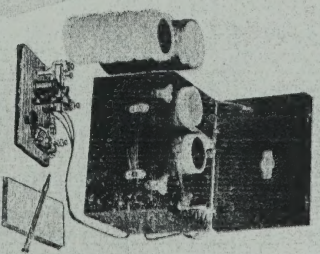
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